CPMT/MPIF/NSF Student Grant Recipient Guide of Critical Dates:

Deadline Date	Time (if applicable)	Action Due	Details
March 31		Return grant registration form per awards letter	Grant recipients must return their registration form to Stephanie at sgibbs@mpif.org. This is your formal acknowledgement back to MPIF that you are accepting the conference grant award. Failure to return the registration form by the due date may result in forfeiture of the grant award.
April 4		Photo and Bio Deadline for Conference App	Deadline to submit your photo and biography, email these to dstab@mpif.org
May 2		Draft Manuscripts Deadline	Submit a draft of your manuscript to Talk 'N Technology chair for review
May 9		Chair Review due to Student	By this date, the Chair should have reviewed the student's manuscript and responded with comments.
May 16		Final Manuscripts Deadline	Author to submit to MPIF their final manuscript via email paper@mpif.org or upload to: https://filerequestpro.com/up/powdermet-ampm2025submission Student to submit: · Copy of Manuscript · Transfer of Copyright Agreement · Keyword Form
June 2		Submit Digital Posters to MPIF	Author to submit to MPIF a digital (.pdf) file of your poster to: hhttps://filerequestpro.com/up/powdermet-ampm2025submission, Posters submitted after this date will not be eligible for Outstanding Poster Awards Competition
June 15	2:00 -5:00 pm	Poster Setup	Authors to bring physical printed posters to the conference and set up their poster in the exhibit hall.
June 15	5:00-6:00 pm	Meet & Greet	Attend Conference Meet and Greet, Exhibit Hall
June 16		Poster Discussion	Poster authors should be at their posters and available for discussion during Monday Alehouse in the exhibit hall
June 16-18	As scheduled		Complete a 25-minute Talk 'N Technology presentation at the conference as scheduled, this should be synopsis of your poster work during the conference. Bring a copy of your presentation on a USB drive for transfer to MPIF computers.
June 17	1:00-3:30 pm	Poster Removal	Poster authors are responsible for removing their posters. Posters not removed by 3:30 pm will be discarded.

July 3		Post-Conference Writeup	Write a post-conference experience essay highlighting your experiences and observations from the conferences. Email essay to Stephanie @ sgibbs@mpif.org
July 23		Final Replacement Manuscript Deadline	If changes are warranted in the submitted manuscript, a replacement manuscripts should to be emailed to paper@mpif.org or uploaded to https://filerequestpro.com/up/powdermet-ampm2025submission by author by this date

General Information and Instructions:

MPIF Staff Contacts

Questions concerning your conference participation should be directed to the appropriate individual:

Debby Stab – dstab@mpif.org or 609-250-7846

- Poster Program
- Submission of Biography & Photo for Conference Mobile App
- Manuscript Preparation, Publication

Stephanie Gibbs – sgibbs@mpif.org or 609-250-7856

- Registration/Hotel Accommodations
- Outstanding Technical Paper Awards: Howard I. Sanderow and Metal Additive Manufacturing
- Letters of Invitation for U.S. Entrance Visas
- Student grant questions

Speaker Photo & Biography

Submit your photo and bio to Debby Stab (dstab@mpif.org) by the deadline.

Photos

- Color, portrait orientation at least 200x300 pixels, saved as a jpg, or tif.

Bios

- 100 words or less.

Example of a 100 word bio

Rand German is Professor Emeritus, San Diego State University. His PhD degree is from the University of California at Davis, MS from The Ohio State University, and BS from San Jose State University; he is distinguished alumnus from all three universities. In his career he held three Chaired Professorships and directed major research efforts winning $59 million in grants. He published 1023 articles, 20 books, 25 patents, and 19 edited books. He has an honorary doctorate, Tesla Medal, and is a Fellow of three technical societies.

Posters –

Poster Awards - The designation of "Outstanding Poster" and "Poster of Merit" will be awarded by the Poster Program Awards Committee based on the following criteria:

- Technical, scientific, and professional integrity
- Presentation clarity and overall esthetic appearance
- Enhances practical or industrial value for the industry

In order to be eligible for judging, digital .pdf files of the poster must be uploaded **by the required submission date** (see page 1) to: https://filerequestpro.com/up/powdermet-ampm2025submission and ***author must bring a physical printed copy of the poster to the conference.***

Poster Preparation

- Posters must contain authors' names, title of poster, objective of the work, along with materials such as graphs, charts, tables and photographs that are necessary to convey the research.
- Posters should a visual representation of the work and should be easy to read from a distance of 304 cm (10 feet). A poster with extensive written text is not easily read at 10 foot.
- An abstract and a list of references i**s not required** for posters & may degrade the visual aspect of the poster.
- Poster shall be written in English.
- All units of measurement must be expressed in SI units. Inclusion of Inch-Pound units in parenthesis is optional.
- **Sending MPIF Digital Copies of Posters for Judging:**
  - Digital Copies of posters should be named with your **MPIF Assigned Poster Number** and Authors last name, i.e., Poster 914 from John Smith would be 714-Smith.pdf. Your MPIF assigned poster number was sent to you by Stephanie Gibbs (sgibbs@mpif.org).
  - Digital copies of posters must be prepared in PORTRAIT format and should be uploaded in .pdf format.
- **Bring a printed copy of your poster to the conference for display at the conference.**
  - The maximum size of poster is 91.4 cm (36") wide x 182.9 cm (72") long area. Posters that exceed these dimensions will have to be cut or cannot be hung.
  - Posters must be printed in PORTRAIT format.
  - Each presenter will be provided a hard-standing panel with a 91.4 cm x 182.9 cm (3' x 6') area in which the poster information will be affixed to panels with Velcro provided by MPIF.

Poster Setup/Display

- Authors must bring printed copies of their posters to the conference.
- Authors will be responsible for hanging their posters, see page 1 for Setup Time.
- Authors are responsible for removing posters, see page 1 for poster removal time.
- Posters not removed per the schedule will be discarded. *(MPIF is not responsible for returning/shipping posters to authors)*
- Figures, tables, photos, illustrations, etc. should be clear and legible from about 304 cm (10 foot).
- Photomicrographs should include a magnification marker within the body of the image, preferably on the lower right corner of the image.

Manuscript Preparation Guidelines

All Student Grant Recipients are required to submit a manuscript explaining their conference poster work.

The student is responsible for submitting the final manuscript to paper@mpif.org or uploading it to: https://filerequestpro.com/up/powdermet-ampm2025submission after session chair review and approval. The manuscript must be

- Submitted in PDF format.
- Your manuscript should include a manuscript title, list of authors, abstract, introduction, experimental procedure, results and discussion, conclusion, and references sections.
- Digital Copies of manuscripts should be named with your **MPIF Assigned Manuscript Number** and Authors last name, for example manuscript 814 from John Smith would be 814-Smith.pdf. Your MPIF Assigned manuscript number was sent to you by Stephanie Gibbs (sgibbs@mpif.org).
- Replacement manuscripts would include the revision, i.e., 814-Smith-2.pdf.
- Conference Proceedings are assembled directly from the manuscript files provided, but MPIF reserves the right to edit.

Manuscript Format/Layout (refer to sample pages)

- Include an abstract on the title page.
- 21.6 cm x 27.95 cm (8.5 in. x 11 in.) paper settings, PDF format.
- 2.5 cm (1 in.) margins on all sides, single column, single spaced, left justified, no page numbers.
- Use 11 point, Times New Roman font. Use primarily black type.
- Do not type the keywords as part of the manuscript. Keywords should be submitted separately utilizing the KEYWORD FORM.

Units of Measurement

- All units of measurement must be expressed in SI units. It is optional to include the Inch-Pound equivalent in parenthesis, i.e., 2.5 cm (1 in.).

Figures and Tables

- All photos, illustrations, tables, etc. must be clear and legible.
- The word "Figure", the figure number, and the figure caption are typed Flush Left Below the figure.
- The word "Table", the table number, and the table title are typed Centered Above the table.
- Please reference all tables and figures in the text of the manuscript.
- Tables and figures should appear within the text as close as possible to where they are referenced; do not place all tables and figures at the end of the manuscript.
- Photomicrographs must include a magnification marker within the body of the image, preferably on the lower right corner of the image.

Comparisons

- Comparisons of products or processes used in research work should be referenced generically in both the oral presentation and manuscript text.

Examples:

- "powder A versus powder B" or use the MPIF material designation such as "FN-0205 as- sintered versus
  FN-0205 heat treated."

Experimental Procedure

- The Experimental Procedure section should include enough detail for other researchers to replicate the experiments.
- For chemical analysis, specify the sample preparation method (or refer to MPIF Standard Guide 67) and the analysis method, e.g., ICP-OES or XRF. Provide metallographic sample preparation details (or reference MPIF Standard Guide 70, 71, or 72, as applicable). Similar details should be included for powder characterization, and mechanical, physical, or magnetic property evaluations.
- Reference standardized test methods and note any deviations. If no standard exists, give a full procedure description.

References

- Ethics, as well as copyright laws, require authors to identify sources. All references listed must be cited in the text.

Formatting Guidelines for Writing a Manuscript

SAMPLE

Example of a properly formatted Manuscript starting with the Proper Paper Size (8.5 in. x 11 in. paper setting), Font (11 pt. Times New Roman), and Manuscript Format. The manuscript should include Title, Authors, Abstract, Introduction, Data Tables, Figures, Conclusion, and References. The manuscript should not include Keywords, Page Numbers, or a Summary.

12.5 cm (5 in.) Ref. to start of Abstract.

Mix Solution for High Green-Strength and Green Machining

Amber Tims, Roland Warzel, Bo Hu
North American Höganäs
Hollsopple, Pennsylvania

Per Knutsson, Asa Ahlin, Angelica Hansen
Höganäs AB
Höganäs, Sweden

Example shows the Title Page formatted correctly. Only capitalize the first letters of titles. Title centered horizontally and vertically.

Begin your abstract here 12.5 cm (5 in.) from the top page (this is the starting line for the first page only)

ABSTRACT

A novel lubricant system that provides increased green strength has been developed. By achieving a high green strength, it is possible to reduce the formation of green cracks during part ejection and handling which provides the possibility of reducing green scrap. Another potential opportunity with high green strength is the ability to facilitate green machining. This novel lubricant system has been developed to provide high strength together with good fill and ejection characteristics. In this study, the performance of this newly developed mix system is evaluated and compared to the common industry lubricant amide wax. The novel lubricant system is shown to increase the green strength of various materials by up to 80% compared with premixes based on amide wax. This increase in green strength will also be shown to provide opportunity for a robust green machining solution.

2.5 cm (1 in.) side margins Typ.

INTRODUCTION

Green strength is an essential property in powder metallurgy (PM) manufacturing due to the constant demand for increasingly complex and robust compacts. Sufficient green strength is required to prevent cracks from forming during the ejection process and to avert damage from occurring during the transportation of green components between the press and sintering furnace. The fragility of green PM components makes them vulnerable during handling which increases the potential for green scrap and reduced profitability.

The consolidation and interlocking of particles, also referred to as cold-welding, is the primary source of green strength for powder compacts [1]. While lubricant is necessary in PM compaction to reduce inter-particle and die wall friction to allow for ejection and densification, lubricant will also inhibit the micro-welds that occur between the particles during compaction by creating a boundary between the interlocking particle surfaces [2].

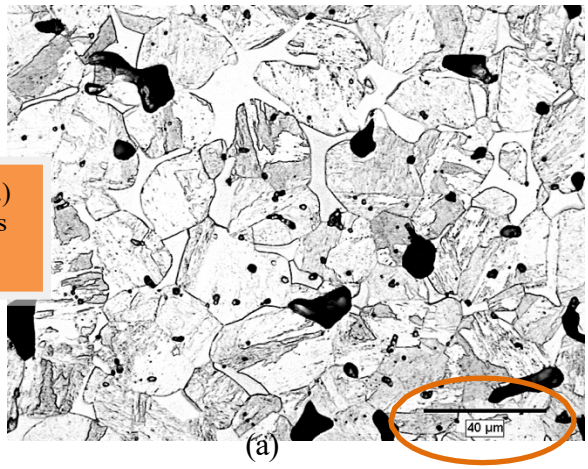
2.5 cm (1 in.) margins at top and bottom of most pages

No Page Numbers

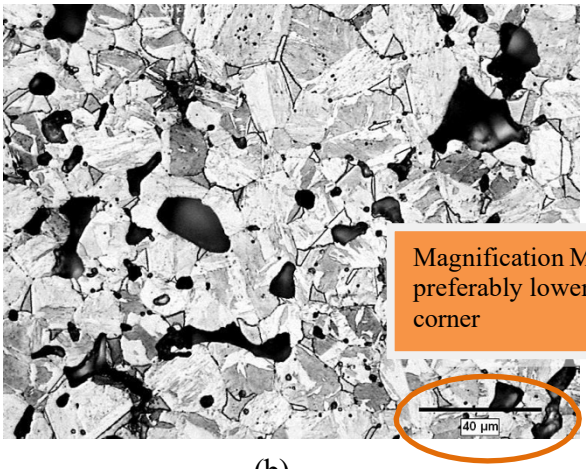
SAMPLE USE OF FIGURES

2.5 cm (1 in.) margins at top and bottom of most pages

2.5 cm (1 in.) side margins Typ.



(a)



(b)

Magnification Marker — preferably lower right corner

Figure 1. Representative microstructures: (a) press + sinter PM dual-phase stainless steel; sintered density 7.20 g/cm3 (b) press + sinter PM 17-4 PH; sintered density 6.70 g/cm3.

For Figures, Title is placed below and to the left as shown above.

Precipitation hardening stainless steels are not defined by their microstructure, but rather by the strengthening mechanism. These grades can have austenitic, semi-austenitic or martensitic microstructures and can be hardened by aging at moderately elevated temperatures, 480 °C to 620 °C (900 °F to 1150 °F). The strengthening effect is due to the formation of intermetallic precipitates from elements such as copper or aluminum. Aluminum's high affinity for nitrogen and oxygen in PM stainless steels necessitates strict atmosphere control during sintering and, for this reason, copper is the most commonly used element for precipitation hardening. These alloys generally have high strength and high apparent hardness while exhibiting superior corrosion resistance compared with martensitic stainless steels. This improved corrosion resistance is derived from the fact that the carbon levels are low, and the martensite is formed from additions of nickel and copper. The low carbon martensite that is formed is weaker but more ductile than the martensite formed in alloys such as SS-410-90HT (carbon bearing), but the strength of these alloys is developed by aging.

For Tables: Title centered over table as shown below.

2.5 cm (1 in.) side margins Typ.

SAMPLE USE OF A TABLE

Table I: Composition **Table I:** of Stainless Steel PM Alloys (wt.%).

Alloy	C	P	Si	Cr	Ni	Cu	Mn	Mo	Cb
17-4PH	0.018	0.025	0.85	17.1	4.00	3.55	0.15	0.03	0.25
409LNi	0.013	0.01	1.00	11.3	1.30	0.04	0.12	0.05	0.56
DP2	0.015	0.014	0.84	11.6	1.03	0.29	0.10	0.22	---
SS-410-90HT	0.200	0.012	0.81	12.0	0.14	0.01	0.11	0.05	---

One of the most common precipitation hardening stainless steel grades in both the wrought and PM industries is 17-4 PH (Table I). This grade has a martensitic microstructure, and its strength and hardness can be improved by aging treatments.

2.5 cm (1 in.) margins at bottom of most pages

No Page Numbers

For Figures & Graphs, Title is placed below graph and to the left as shown below.

Sample Use of Graphs

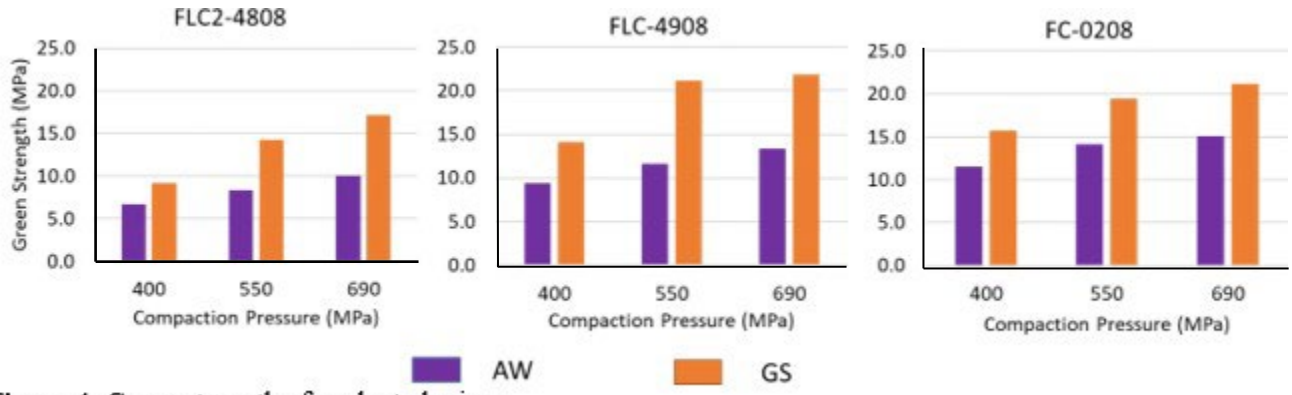


Figure 4: Green strength of evaluated mixes.

REFERENCE - IMPORTANCE AND FORMATS

References show that you have carefully reviewed the relevant literature and are now contributing something novel to the powder metallurgy community. You establish authority and credibility when you can critically assess other literature and distinguish your findings from previous work (if any exists). Referencing allows you to acknowledge the contribution of other writers and researchers in your work. All technical research papers that draw on the ideas, words or research of other writers must contain citations. Referencing is also a way to give credit to the writers from whom you have borrowed words and ideas.

Authors may cite any technical manuscripts, books, conference proceedings, posters, magazine or journal articles, patents, thesis, websites, reports, DOI (Digital Object Identifier) or private communication. Number the citations consecutively according to the first mention of each source in the text of the manuscript (using the same number for subsequent references to the same source). In order to be consistent with the guidelines set for the **International Journal of Powder Metallurgy** for the number reference system, the number is placed in the appropriate place in the text, starting from the number 1and should be in superscript font.

The Reference format should be as shown on next page **Examples of References**.

For Example:

> Brazing and fusion welding of aluminum is commonplace for a variety of alloys and applications [1]. Heat-treatable aluminum alloys containing eutectic-forming elements (Cu, Si, Mg, Zn), however, are particularly problematic to weld and can be susceptible to liquation cracking within the immediate vicinity of the weld [2]. Moreover, Storjohann et al. demonstrate the propensity for thermal decomposition of ceramic reinforcements in Al-Al2O3 and Al-SiC composites during fusion welding [3].

Examples of References Utilized in a Manuscript

(Examples of a Publication /Book reference)

1. C. Huang, G. Cao, and S. Kou. "Liquation Cracking in Aluminum Welds", Mater. Sci. Forum, 2007, vol. 539-543, pp. 4036–4041.
2. T. Murphy, B. Lindsley, "Microstructural Evolution during Sintering and Fracture Behavior, of Iron-Copper-Carbon Compacts Made with Elemental Powders", *Materials and Performance Characterization 9,* ASTM International,2020, no. 4, pp 470-485.

(Examples of Journal reference)

3. T. Le, R. Stefaniuk, H. Henein and J-Y. Huôt, "Measurement and Analysis of Melt Flowrate in Gas Atomization", Int. J. Powder Metall., 1999, vol. 35, no. 1, pp. 51– 60.
4. Corey W. Hennessey, William F. Caley, George J. Kipouros, and D. Paul Bishop, "Development of a PM Aluminum Alloy: Effect of Post-Sinter Coolong Conditions", Int. J. Powder Metall., 2006, vol. 42, no. 6, pp. 39-50.

(Example of a Proceedings reference)

5. P. Lemieux, S. Pelletier, P.E. Mongeon, Y. Thomas, L.P. Lefebvre, F. Chagnon, "A New Approach to Die Wall Lubrication for P/M Applications", *Proceedings of the 2001 International Conference on Powder Metallurgy & Particulate Materials*, New Orleans, Louisiana, May 13–17, 2001.
6. A. Neilan, R. Warzel, P. Knutsson, A. Ahlin, "High Performance Lubricant for Warm Die Compaction", *Proceedings of the PowderMet 2015 Conference,* San Diego, California, May 20, 2015.

(Example of a Patent reference)

7. I.L. Kamel, A. Lawley and M-H. Kim, "Method of Molding Metal Particles", U.S. Patent No. 5,328,657, July 12, 1994.

(Example of a Thesis reference)

8. D.J. Schaeffler, "High-Strength Low-Carbon Powder Metallurgy Steels: Alloy Development with Transition Metal Additions", 1991, Ph.D. Thesis, Drexel University, Philadelphia, PA.

(Examples of a Website reference)

9. J.R. Dale, "Connecting Rod Evaluation", Metal Powder Industries Federation, http://www.mpif.org/design/conrod.pdf
10. N. Dialami, M. Cervera, and M. Chiumenti, "Effect of the Tool Tilt Angle on the Heat Generation and the Material Flow in Friction Stir Welding", Metals-BASEL, 2019, vol. 9, no. 1, https://doi.org/10.3390/met9010028

(Other)

11. T.M. Cimino, A.H. Graham and T.F. Murphy, "The Effect of Microstructure and Pore Morphology on Mechanical and Dynamic Properties of Ferrous P/M Materials", 1998, Hoeganaes Technical Data, Hoeganaes Corporation, Cinnaminson, NJ.
12. P.W. Taubenblat, 1999, Promet Associates, Highland Park, NJ, private communication.
13. Standard Test Methods for Metal Powders and Powder Metallurgy Products, published by MPIF, 2022.

SI Units — Conversion Table
Quantities/Terms Used by MPIF

Quantity	Designation	Inch-Pound Units	Preferred Working Unit	Symbol	Approx. Conversion to SIUnits*
Apparent Density	ρ_a	g/cm^3	gram per cubic centimeter	g/cm^3	—
Applied Magnetic Field	H	oersteds (Oe)	amperes-turns/meter	A/m	X 79.6
Atmosphere Flow	—	ft^3/min	cubic centimeter per second	cm^3/s	X 472.0
	—	CFH	cubic centimeter per second	cm^3/s	X 7.867
Belt Speed	—	ipm	millimeter per minute	mm/min	X 25.40
Bulk Density	—	Ibm/ft^3	gram per cubic centimeter	g/cm^3	X 0.016
	—	Ibm/gal	gram per cubic centimeter	g/cm^3	X 0.120
Coefficient of Thermal Expansion	—	$x10^{-6}/°F$		$x10^{-6}/°C$	X 1.8
Coercive Field Strength	H_c	oersteds (Oe)	ampere-turns/meter	A/m	X 79.6
Compacting Pressure	—	tsi	megapascals	MPa	X 13.79
Crush Strength	K	10^3 psi	megapascals	MPa	X 6.895
Fatigue Limit (Strength)	—	10^3psi	megapascals	MPa	X 6.895
Force	—	lbf	newton	N	X 4.448
Flow Time	—	s/50 g	second per 50 grams	s/50 g	—
Fracture Toughness	K_{IC}	10^3 psi·$inch^{½}$	megapascals root meter	$MPa·m^{½}$	X 1.1
Green Density	ρ_g	g/cm^3	gram per cubic centimeter	g/cm^3	—
Green Strength	—	psi	megapascals	MPa	X 0.0069
Heating Rate	—	degree Fahrenheit per second (°F/sec)	degree Celsius per second	°C/s	X 0.556
Impact Energy	—	ft·lbf	joule	J	X 1.356
Kinematic Viscosity	—	centistokes (cSt)	meters squared per second	m^2/s	X 1.0 $x10^{-6}$
Magnetic Induction	B	kilogauss (kG)	tesla	T	X 0.1
Particle Size	—	10^{-3} in.	micrometer	µm	—
Powder Mass	—	pound (Ibm)	kilogram	kg	X 0.454
	—	ton	megagram	Mg	X 0.907
	—	ton	metric ton	t	X 0.907
Sintered Density	ρ_s	g/cm^3	gram per cubic centimeter	g/cm^3	—
Specific Surface	—	m^2/g	square meter per gram	m^2/g	—
Surface Finish	—	microinches	micrometer	µm	X 0.0254
Tap Density	ρ_t	g/cm^3	gram per cubic centimeter	g/cm^3	—
Temperature	—	degree Fahrenheit (°F)	degree Celsius	°C	5/9 (°F -32)
Tensile Strength	—	10^3 psi	megapascals	MPa	X 6.895
Thermal Conductivity	—	Btu·ft/(h·ft^{2}·°F)	watts per meter kelvin	W/(m·K)	X 1.731
Torque	—	lbf ·ft	newton meters	N·m	X 1.356
Transverse Rupture Strength	—	10^3 psi	megapascals	MPa	X 6.895
Yield Strength	—	10^3 psi	megapascals	MPa	X 6.895
Young's Modulus	—	10^6 psi	gigapascals	GPa	X 6.895

Example: 1 psi = 0.0069 MPa
If 100,000 psi, then MPa = 0.0069 X 100,000 = 690 MPa

The units in the left column below have been designated as obsolete and ***should not be used in presentations and manuscripts***. The correct SI equivalent units are in the right column.

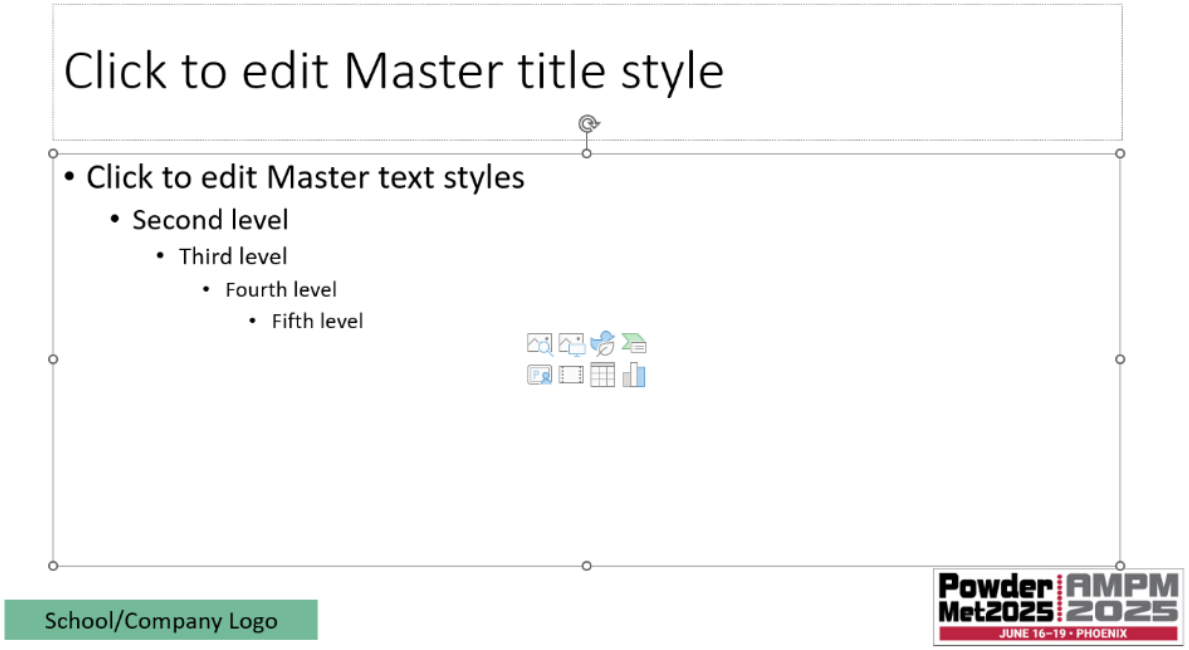
Obsolete Units		Value in SI Units
Name	Symbol	
ångström	Å	Å = 0.1 nm
Atmosphere (standard)	atm	atm = 101.325 kPa
bar	bar	bar = 100 kPa
micron		µ = µm = 10-6m
millimeter of mercury	mmHg	mmHg = 133.3 Pa
stokes	St	St = cm2/s = 10-4 m2/s
torr	Torr	Torr = 133.322 Pa

Grant Talk N'Technology 25-minute Synopsis Presentations

All conference grant award winners must present a 25-minute synopsis presentations in English at the conference based on their poster research project.

PowerPoint Presentations

- PowerPoint should be widescreen 16:9 resolution (Wide Screen).
- Title slide should include the presentation title, authors, co-authors, school or/and company, and the PowderMet2025/AMPM2025 conference logos.
    - Attain Conference Logo at PowderMet2025/AMPM2025
- Subsequent slides may include school/company name and style per speaker's school/company policy.
- Bring a copy of your presentation on a USB drive to the conference to upload the presentation to the MPIF computer as internet service will not be available for downloading.
- Speakers must download their presentations via flash drive to the MPIF computer, if not using their own, in the Speaker Ready Room (area and time to be announced).
- It is recommended that you use your own computer if the presentation contains video animation.
    - Please bring the proper electric cord, service is 110V–120V, and Mac video adapter, if using an Apple computer.



Other Important Information

Conference Mobile App

A mobile app will be released prior to the conference. The mobile app will provide personalized schedules, meeting room locations, abstracts, exhibitor and exhibit hall information, attendee lists, etc.