

# **SPED *Piping Certification Guide***

(Revised: 12/05)

## **Overview**

A Professional Piping Designer (PPD) will obtain certification from SPED if he / she can demonstrate the required skills defined in this document. The Certification will last for 2 years from the date of successfully certification. The PPD certificate SPED awards will document this accomplishment. This certification will benchmark for the industry a level of professionalism in the process piping design community.

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## **(1) Forward**

SPED defines the level of certification roughly in accordance with the following levels of experience competency:

1. **Level I-Basic** : Candidate has had education or training in performing this task, but has not yet performed it on the job
2. **Level II Advanced PPD** : Candidate has performed this task on the job, but with close review and assistance from either a supervisor or a senior employee
3. **Level III Senior PPD** : Candidate has performed this task as a regular part of a job and only in unique or unusual situations did the candidate require assistance or review by a supervisor or a senior employee
4. **Level IV Lead PPD** : Others regularly consult Candidate for his or her expertise and assistance in performing this task or Candidate has managed, trained or supervised others so that they can perform this task

**The following text will define in detail the requirements for a candidate to obtain the different PPD Levels of Certification.**

## **(2) Level I – Basic PPD**

The Candidate will demonstrate by test or by degree or certificate awarded the following skills:

1. The candidate will use generally accepted practices to route, support and assure pipe stays within an existing layout of process equipment arrangement.
2. The candidate identifies basic process equipment, pipe, valves, and fittings from either photographs, drawings or generally accepted 2D and 3D symbols and identifies their nozzles and other points of connection and attachment.
3. The candidate can trace out, sketch and correctly identify process lines on the Process Engineer's P&ID and on a corresponding 2D or 3D representation (Piping Isometrics, Plans, Sections, Renderings) and verify their correctness.
4. The candidate identifies and lists the proper materials for a given piping specification.
5. The candidate identifies situations requiring the application of publicly available piping design standards, including ASME B31.3, B31.1 and API 1104.
6. The candidate designs pipe appropriately to commonly available fabrication and erection methods.
7. The candidate designs pipe to accommodate reasonably foreseeable inspection and maintenance practices.
8. The candidate uses a Computer Aided Design (CAD) system to correctly represent a schematic and dimensioned piping drawings and backup electronic client appropriately.

### **(3) Level II – Advanced PPD**

All the requirements of Level I plus:

The candidate will have a minimum four (4) cumulative years experience within the last eight (8) years performing piping layout and design related projects of a nature deemed suitable by the SPED certification committee. Demonstration through work history and/or additional training the ability to work independently applying the skills listed for Level I. This includes but is not limited to the ability to:

1. The candidate seeks out appropriate technical expertise when engineering judgment or analysis is required.
2. The candidate identifies the impact on piping design of plant unit start-up, shutdown, and normal operation including thermal expansion, contraction and their control through anchors, guides, transverse guides, spring cans, etc.
3. The candidate recognizes the need for and gathers the appropriate information needed before work begins, including:
  - a. P&IDs.
  - b. PFDs.
  - c. Vessel Outlines.
  - d. Equipment Data Sheets.
  - e. Recognize survey needs.
  - f.** Required existing underground, background or reference drawings.
  - g. Piping Specifications, Piping Standards.
  - h. Client CAD requirements.
  - i. Safety requirements.
  - j. Environmental requirements.
  - k. Budget and schedule requirements
4. The candidate recognizes complete sets of data needed for work to be deemed complete.
5. The candidate utilizes commonly accepted methods for managing versions and releases.
6. The candidate extracts data needed to develop and produce the following items:
  - a. Piping bill of material
  - b. Piping Isometrics,
  - c. Line List,
  - d. Specialty Item List,
  - e. Tie- In List,
  - f. Stress Isometrics,
  - g.** Known pipeline spans,
  - h.** Pipe support requirements,
  - i.** Pipe rack loading and other design requirements.
7. Candidate demonstrates of good intra-discipline communication.

## **( 4 ) Level III – Senior PPD**

All the requirements of Level I and Level II plus:

The candidate will have a minimum eight (8) years cumulative experience within the last sixteen (16) years performing piping layout and piping design related projects of a nature deemed suitable by the SPED certification committee.

1.
  1. A Senior PPD will have located, orientated equipment using generally accepted practices with consideration for constructability, site infrastructure & supporting structures.
  2. The candidate will explain the layout implications (equipment required, general characteristics of products involved, operation, maintenance, safety, etc.) of the following processes:
    - Combustion and Furnace Heating
    - Heat Exchangers
    - Cooling & Refrigeration
    - Water treatment
    - Distillation
    - Reactors & Catalyzation
    - Steam generation and distribution
    - Extraction
    - Crystallization
    - Waste Water Collection and Disposal
    - Pressure and Level Control
  3. The candidate correctly orient basic process equipment, their nozzles and other points of connection, attachment, assembly, access, inspection, and maintenance. Orientation should demonstrate knowledge of the internal workings of equipment and its impact on inspection, maintenance and construction. Such equipment includes :
    - Compressors
    - Drums
    - Exchangers
    - Cooling Towers
    - Furnaces
    - Reactors
    - Distillation Towers
    - Pipe Racks
    - Structures
    - Underground Piping
    - Instrumentation
    - Storage Tanks
  4. The candidate will demonstrate the ability to apply customer furnished plant layout specifications.
  5. The candidate identifies the impact on piping design of plant unit commissioning, start-up shutdown, turnaround and normal operation including thermal expansion, contraction, constructor, operator and maintainer access, common modes of equipment failure, etc.,
  6. The candidate identifies situations requiring the application of publicly available plant layout design standards, including those specifying minimum and/or maximum spacing, recommended elevations, placing of handrails/platforms, etc.
  7. The candidate will demonstrate the ability to layout process equipment appropriately and extract necessary data to support commonly available fabrication and erection methods and to accommodate reasonably foreseeable inspection and maintenance practices.

## **( 5 )                    Level IV   Lead PPD**

All the requirements of Level I, Level II & Level III plus;

The candidate will have a minimum Twelve (12) years cumulative experience within the last twenty (20) years performing plant layout and piping design related projects in the Petrochemical industry, of a nature deemed suitable by the SPED certification committee. The candidate must demonstrate a level of training certified by degree or certificate awarded for the following topics:

1. Demonstration through work history and/or additional training the ability to verify work products of the skills listed for Level I, II and III. This includes but is not limited to the ability to:
  - a. Assess the skill levels of others assigned to work processes and estimate the time required for completion by those individuals;
  - b. Describe required work processes through proposals and work plans;
  - c. Seek out appropriate technical expertise when engineering judgment or analysis is required
  - d. Perform detailed piping design calculations and analyses and document results to the satisfaction of a supervising engineer.
  - e. Assign work along with all required information; and
  - f. Verify the integrity, completeness and format of work products and extracted information in an integrated application environment.
2. Demonstrate through work history & or additional training the ability to :
  - a. Bid man hours on limited information.
  - b. Client interaction
  - c. Staffing ability, skilled I hiring & termination procedures.
  - d. Establish schedules.
  - e. Employee motivation
  - f. Manage change.

## **( 6 )    Qualifications Acceptable for Certification as PPD**

Certification requirements can be satisfied by a combination of on-the-job and formal training and/or education. The acceptability of any job experience, education or training for any qualification purpose is at the sole discretion of the SPED certification committee. Acceptable qualifications include (but are not limited to) the following:

- a)            Recent experience (appropriate to each level) performing piping design related projects of a nature deemed suitable by the SPED certification committee;
- b)            College/university coursework from an accredited institution in a curriculum covering the listed topics required for certification.
- c)            Specialized professional development courses offered by entities such as SPED, ASME, AIChE, SPED, etc., as deemed suitable by the SPED certification committee;
- d)            Successful completion of in-house training programs that covering the listed topics required for certification.

**In all cases, the judgement of SPED certification committee as to the suitability of any credential submitted for consideration is final.**

## (7) Maintenance of Certification

### Bi-Annual Renewal Requirement

Every two years, holders of a SPED certification must submit a request to renew certification. For these two years, least 60 Professional Development Units total (average 30 per year) must be accumulated and documented to the satisfaction of the SPED certification committee. The goal is to maintain professional skills and therefore, extra units cannot be carried forward to satisfy requirements for subsequent years.

## (8) Professional Development Units

Professional Development units will be awarded for various types of documented professional development activities. The following table lists the PDU's awarded for different types of activities and examples of activities that could be used in earning units required for maintaining SPED certification.

Activity	Professional Development Units	Examples
Attend a meeting of a professional society conference, workshop, working group, technical committee, CAD user group, board or similar function	5 Units per day of Meeting	ASME Pressure Vessel Committee Meetings, SPED Board and Annual Meetings, etc.
Complete a Piping-Related University Level Course or Training Class	1 Unit per Contact Hour of Class Instruction	SPED PDS I Course (36 Units). College/university coursework (see attached list for UH-Downtown piping related coursework)
Review of Piping Related software or hardware, e.g. attend a vendor presentation at office or conference, tour vendor plant, witness use of product, etc.	1 Unit per Contact Hour of presentation, review or demonstration	Attend Lobos Exhibition and documents three hours of product review (3 Units), review a vendor proposal for 6 hours (6 units), hear 1 hour presentation in-house (1 Unit)
Submit a piping related tip or short article to un-refereed, un-edited newsgroup, website, etc.	1 Unit per page of printed article	2 page tip posted to SPED website (2 Units), 1 page reply to newsgroup question (1 Unit)
Publish a piping related tip or short article to un-refereed, newsletter, magazine, etc.	2 Units per page of printed article	2 page article in SPED Newsletter (4 Units), 4 page article in Plant Engineering (8 Units)
Publish a piping related note, paper chapter in refereed journal, book, etc.	5 Units per page of printed article	9 page article in ASME Journal of Pressure Vessel Technology (45 Units), 15 page chapter in Book (75 Units)
In house training	1 Unit per hour	Lunch time training sessions

## **(9) References**

Together with the detailed work history, the references supplied to verify your Piping Design capabilities and to evaluate your overall suitability to be a PPD are probably the most important elements in your application. For this reason, discretionary references should be selected with serious reflection.

As a minimum three (3) references are required. It is preferred that all references from Piping Designers or Engineers are personally qualified to evaluate your pipe design training and experience. References' statements are valid for one year after receipt by the SPED Board. Current Certification Board members may not serve as references except in cases of students.

It is important that older references be periodically checked, especially in cases of job transfers to a different company or remote town. Too many possible references are "lost" by losing contact with past associates and employers. It is a good idea to maintain more than one potential reference from each source.

## **(10) Piping Design and Plant Layout Related Courses Offered at UH-Downtown**

ET 2401: Piping Drafting I  
ET 2402: Piping Drafting II  
ET 3401: Process Piping Design  
ENGR 3308: Fluid Mechanics I  
ET 3307: Applied Thermodynamics  
ET 3308: Materials Science  
ENGR 3410: Process Modeling and Simulation  
ENGR 3302: Engineering Economics  
ET 4301: Piping Models  
ET 4304: Pressure Vessel Design  
ET 4307: Fluid Mechanics II  
ET 4311: Heat Power Applications  
ET 4313: Applied Heat Transfer  
ET 4315: Pipe Stress Analysis  
ENGR 4340: Senior Project in Piping Design

### **Attachments:**

Application for Certification  
Reference Worksheet (Included in Application)  
Renewal Form