

**Project Number:** STIN-0181  
**Project Title:** Development of Acceptance Strain Criteria on Single Piece Cold Formed Heads from Carbon Steels and Low Alloy Steels  
**Solicitation Date:** 30 April 2024  
**Proposal Due Date:** 31 May 2024

## 1 Summary

ASME Standards Technology, LLC (ASME ST-LLC) is soliciting proposals for the referenced project to develop acceptance strain criteria on single piece cold formed heads from carbon steels and low alloy steels.

This Request-for-Proposal (“RFP”) and all open RFPs are posted on the ASME ST-LLC webpage: ([http://asmestllc.org/ST-LLC\\_RequestsProposals.html](http://asmestllc.org/ST-LLC_RequestsProposals.html))

## 2 Scope of Work

### 2.1 Background

The issues with one piece head forming strain calculations were acknowledged over 20 years ago and have been discussed in several open items 99-344, 01-743 and 16-333. It is generally agreed that the forming strain calculation for one-piece heads in ASME Section VIII Division 1 is incorrect. However, no consensus has been established on how to correct this error because of historical and practical reasons. Recent studies confirmed the issues with forming calculations by both experimental measurements and Finite Element Analysis (FEA). Data is required to establish the basis of the forming strain criteria for heat treatment.

### 2.2 Summary

The objective of this project is to provide the technical basis for the forming strain criteria of one piece cold formed heads. The underlying issue is that the cold forming strain obtained using ASME Section VIII, Division 1 (also in BPV XII, BPV I and BPV III) formula for single piece heads significantly underestimates the actual forming strain. ASME Section VIII, Division 2 formula (Bouhelier equation) provides a more accurate calculation of forming strain. However, with a different calculation formula, Division 2 uses the same strain acceptance criteria as Division 1 to exempt the post forming heat treatment which is also considered to be technically unjustified.

In order to correct the forming strain calculation using the strain calculation equation in ASME Section VIII Division 2, and to implement the correct acceptance criteria to preclude post fabrication heat treatment, the following tasks will be performed by the Independent Consultant:

**Phase I**

- Fabricate a total of six formed heads with two representative materials (SA-516 Gr. 70 and SA-387 Gr. 11) by cold press or cold spin. The representative forming shall cover a strain range from 5 to 25%. Suggested geometries below, no stamping is required.

Head Type	D (mm)	L (mm)	IKR (mm)	SF (mm)	Div. 1 forming strain (%)	Div. 2 forming strain (%)
ASME 2:1 elliptical	1219 (48")	1097 (43.2")	207.2 (8.16")	80 (3.1")	6	25
ASME 80:10	1219 (48")	975.3 (38.4")	121.9 (4.8")	60 (2.4")	10	18
ASME torispherical	1219 (48")	1219 (48")	73.1 (2.88")	40 (1.6")	16	15

- Measure the plastic deformation of the formed heads using mesh grid method.
- Measure head thickness at center of the head, knuckle area and straight flange.
- Generate tensile strength data at RT and -20°F on samples from the formed heads.
- Generate impact toughness properties at RT and -20°F on samples from the formed heads.
- Generate fracture toughness properties at RT and -20°F on samples from the formed heads.
- Samples are to be taken from six formed pressure heads with dimensions OD=48" and t= 5/8".  
From each head:
  - Eight tensile tests (ASTM E08): two at knuckle, two at straight flange, at 70°F and -20°F.
  - Four sets of full size CVN (ASTM E23): one set at knuckle, one set at straight flange, at 70°F and -20°F.
  - Eight fracture toughness (ASTM E1820): two at knuckle, two at straight flange, at 70°F and -20°F.
- Test summary:

TESTS	TEMPERATURE (°F)	TOTAL # OF SPECIMENS
Tensile	RT	24
Tensile	-20	24
CVN	RT	12 sets
CVN	-20	12 sets
E1820	RT	24
E1820	-20	24

**Phase II**

- Establish a correlation between head geometry, forming strain and toughness values.
- Perform fracture mechanics analysis using the fracture toughness data.
- Establish the allowable forming strain criteria to preclude in service failures and recommend requirements for post fabrication heat treatment.

## 2.3 Deliverables

The Independent Consultant will prepare, submit, and finalize the following deliverables, which include all experimental and analytical results from the scope above:

### Phase I

- Fabricate a total of six formed heads with two representative materials (SA-516 Gr. 70 and SA-387 Gr. 11) by cold press or cold spin.
- A detailed test report identifying test methodologies used and reference methods, and raw test data as per the previously referenced scope of work items.

### Phase II

- A detailed analysis report using the fracture toughness data resulted from Phase I and establishing the allowable forming strain criteria to preclude in service failures and recommend requirements for post fabrication heat treatment, as per the previously referenced scope of work items.
- The analysis report will include recommendations on forming strain limits for post fabrication heat treatment requirements based on the ASME Section VIII, Division 2 equation (Bouhelier formula). Revisions will be recommended in ASME Section I PG-19, Section III NX-4213, Section VIII1 UG-79 and UCS-79, Section VIII-2 6.1.2.3, Section XII TF-310.

## 2.4 Schedule

The expected duration of this project is 18 months.

## 2.5 Reporting

Status reports shall be provided monthly via email to the ASME ST-LLC project manager. The Independent Consultant shall provide an initial status report within 30 days of the contract execution date. For all status reports, the Independent Consultant shall identify: activities underway, planned, and completed; any unforeseen problems; and any anticipated delays to the project schedule.

## 3 Respondent Eligibility Requirements

ASME ST-LLC is seeking proposals from all qualified organizations including, but not limited to, engineering firms, independent consultants, academic institutions, and federally funded research and development centers. In addition to relevant technical qualifications and experience, respondents must possess an understanding of relevant ASME codes and standards.

## 4 Basis for Selection and Award

ASME ST-LLC will select the winning proposal by evaluating and comparing the merits of each respondent's complete proposal. This process reflects ASME ST-LLC's desire to select application proposal based on its potential to achieve program objectives, rather than solely on evaluated technical merit or cost. Evaluation criteria include, but are not limited to, the following:

- Respondent's technical capabilities
- Respondent's applicable experience
- Proposal price
- Project schedule
- Any exceptions to this RFP

Respondents have the option to submit their proposals for one or both phases of the project.

ASME ST-LLC reserves the right to award, in whole or in part, any, all, or none of the proposals answering this solicitation.

## 5 Contract Terms and Conditions

A form of ASME ST-LLC's standard agreement applicable to this Scope of Work is attached as Attachment 1 to this RFP.

ASME ST-LLC will provide access to applicable codes, standards, and other technical references as needed to perform the Scope of Work.

## 6 Submission Requirements

### 6.1 Proposal Due Date

Proposal must be submitted by 31 May 2024. Respondents are encouraged to transmit its proposal well before this deadline. Requests for extra time must be sent by 15 May 2024 to the contact listed in Section 7 of this RFP.

ASME ST-LLC intends to select the winning proposal within three weeks of the proposal deadline.

### 6.2 Proposal Preparation Costs

Proposal costs shall be borne by the respondent. This solicitation does not obligate ASME ST-LLC to pay any costs incurred in the preparation and submission of the proposal, in making necessary studies or designs for the preparation thereof, or to acquire, or contract for any services.

### 6.3 Proposal Clarification

ASME ST-LLC reserves the right to request clarification of the proposal and/or supplemental information. The award may be made after few or no exchanges, discussions, or negotiations. Therefore, all respondents are advised to submit its most favorable application to ASME ST-LLC. ASME ST-LLC reserves the right, without qualification, to reject any or all proposals received in response to this solicitation and to select any proposal, in whole or in part, as a basis for negotiation and/or award. ASME ST-LLC reserves the right to modify or cancel this solicitation. All questions relating to the solicitation must be submitted to the contact listed in Section 7 herein. Any amendments to the solicitation will be posted on the ASME ST-LLC website previously referenced.

#### **6.4 Treatment of Proprietary Information**

A proposal may include technical and/or other data, including trade secrets and/or privileged, confidential commercial or financial information, which the respondent does not want disclosed to the public or used by ASME ST-LLC for any purpose other than proposal evaluation. To protect such data, the respondent should specifically identify the data or information to be protected.

#### **6.5 Proposal Preparation and Submittal Instructions**

ASME ST-LLC may form a committee of subject matter experts to evaluate the technical qualifications of applicants. To help facilitate this evaluation, proposals should be separated into two separate documents: (1) a Technical Proposal; and (2) a Financial Proposal.

##### 6.5.1 Technical Proposal contents must include:

- Provide organization name and contact information.
- Provide evidence of technical capabilities: credentials, qualifications, capabilities, and experience of individuals and the organization.
- Describe approach to accomplish the Scope of Work (refer to Section 2), including a proposed timeline.
- Demonstrate agreement with the Scope of Work (refer to Section 2).

##### 6.5.2 Financial Proposal contents must include:

- Provide a price quotation.
- Provide a schedule to complete each milestone.
- Confirm agreement with the form of agreement attached herein, or state any requested exceptions to same.

6.5.3 The respondent shall submit the Technical and Financial Proposals files via e-mail to the ASME ST-LLC contact identified in Section 7 of this RFP. Responses must be received on or before the proposal due date identified in Section 6.1 of this RFP.

## **7 ASME Standards Technology, LLC Contact Information**

All correspondence regarding this RFP is to be directed to the following person:

Mr. Dan Andrei  
Senior Project Manager  
ASME Standards Technology, LLC  
Two Park Avenue  
New York, NY 10016  
Telephone: 212-591-7146  
E-mail: andreid@asme.org

ASME Standards Technology, LLC

**REQUEST FOR PROPOSALS**

RFP No. 24-02

ATTACHMENT 1: FORM OF AGREEMENT



**ASME Standards Technology, LLC**  
**Nonexclusive Independent Consultant Agreement**  
**Standard Terms and Conditions**

**[Project Number: Title]**

This Agreement, effective upon execution by both parties, is made between ASME Standards Technology, LLC (“STLLC”), a New York not-for-profit corporation with its principal office at Two Park Avenue, New York, New York 10016 and **[Insert Consultant Name and Address, spelled out completely]** (the “Independent Consultant”).

**W I T N E S S E T H:**

**WHEREAS** STLLC desires to engage the Independent Consultant to perform **[insert scope description]**; and

**WHEREAS** the Independent Consultant agrees to accept such engagement and to perform the services hereinafter specified;

**NOW, THEREFORE**, in consideration of the foregoing and the mutual agreements of the parties contained in this Agreement, it is agreed as follows:

**1. Engagement.** STLLC hereby engages the Independent Consultant, on an as needed and nonexclusive basis, to perform the services defined in Annex 1 to this Agreement (the “Work”).

**2. Performance.** The Independent Consultant agrees to perform the services set forth above. The Independent Consultant agrees to perform such services professionally and to the best of its ability, to provide the services in an ethical manner, and to avoid conflicts of interest and any appearance thereof. It is understood that the Independent Consultant may obtain other consulting work and, as a result, may be unavailable, from time to time, to perform consulting services for STLLC, but the Independent Consultant agrees to adhere to the ASME Policies on Conflicts of Interest and Ethics. STLLC will not set specific daily schedules. STLLC will not provide tools, materials, supplies or equipment necessary for the Independent Consultant to perform the Work except for the necessary codes, standards, and procedures. Neither will STLLC reimburse the Independent Consultant for the use of its tools, materials, supplies or equipment. The Independent Consultant shall not engage subcontractors to perform any portion of the Work without the written approval of STLLC. If Independent Consultant

services require access to STLLC or ASME systems or their internal networks, that access must conform with ASME and STLLC use policies.

**3. Fees.** For all services to be rendered by the Independent Consultant to STLLC, as required by STLLC, the Independent Consultant will receive fees as specified in Annex 2 to this Agreement. It is understood and agreed that the Independent Consultant is performing services as an independent contractor. As a result, STLLC will not withhold any tax, of whatever nature, from payments made by STLLC to the Independent Consultant. The Independent Consultant is solely responsible for meeting federal, state, or local income tax liabilities. The total charges for all fees and expenses shall not exceed the contract value specified in Annex 2 to this Agreement.

**4. Expenses.** Expenses incurred by the Independent Consultant in connection with the Work shall be borne by the Independent Consultant as part of the total compensation for the Work.

**5. Terms of Payment.** The Independent Consultant shall submit associated invoices for acceptance by STLLC prior to payment. Invoices shall be submitted following achievement of milestones specified in Annex 2 to this Agreement. Payment shall be 100 percent net due 30 days after receipt of an acceptable invoice from the Independent Consultant. In the event of delay in project or milestone completion, the [performing party] shall pay liquidated damages to ASME ST-LLC in the amount of 10% per week for the milestone that is delayed unless it is pre-approved by ASME ST-LLC, not to exceed the total dollar amount of the milestone.

**6. Benefits.** The Independent Consultant is not eligible for, and will not receive, any benefits from STLLC based on services performed under this Agreement.

**7. Copyright and Ownership.** The Independent Consultant agrees that STLLC specially ordered and commissioned the Work as “work made for hire” as that term is defined in the United States Copyright Act (17 U.S.C. §101), and that for purposes of the copyright laws, STLLC shall be deemed the “author” of the Work. If it is determined that the Work is not a work made for hire under the U.S. Copyright laws, then, as of the creation of the Work, the Independent Consultant hereby assigns exclusively and irrevocably to STLLC all worldwide, present and future right, title and interest in the Work, including the copyrights and other proprietary rights existing in the Work (including all United States and foreign copyrights,

all copyrights under any treaties, conventions, proclamations, or the like, and all extensions of such copyrights; all artistic and literary property rights; all moral rights; all rights to apply for or obtain any registrations for copyright in the Independent Consultant's name; and the right to sue and recover for any infringement of the Work). The Independent Consultant may not reproduce the Work in any form without STLLC's prior written permission.

**8. Indemnification and Hold Harmless.**

**a. Obligation of the Independent Consultant** – The Independent Consultant shall indemnify, defend and hold harmless STLLC and its officers, directors, employees and agents and each of them from any and all claims, actions, causes of action, demands, liabilities of whatsoever kind and nature including judgments, interest, attorney's fees, and all other costs, fees, expenses and charges which STLLC, its officers, directors, employees, agents and each of them, may incur arising out of the negligence, gross negligence or willful or wanton misconduct of the Independent Consultant, its officers, directors, employees or agents.

**b. Obligation of STLLC** – STLLC shall indemnify, defend and hold harmless the Independent Consultant and its officers, directors, employees and agents and each of them from any and all claims, actions, causes of action, demands, liabilities of whatsoever kind and nature including judgments, interest, attorney's fees, and all other costs, fees, expenses and charges which the Independent Consultant, its officers, directors, employees, agents and each of them, may incur arising out of the negligence, gross negligence or willful or wanton misconduct of STLLC, its officers, directors, employees or agents.

**9. Term.** It is mutually agreed that the Independent Consultant will commence work on this project immediately upon execution of this Agreement, and continue until completion, but no later than \_\_\_\_\_(completion date). If the work is not completed by \_\_\_\_\_(completion date), the contract may be extended in writing via an Amendment to the Contract and must be executed by both parties prior to the completion date.

**10. Termination.** STLLC shall have the right to terminate this agreement upon 14 days notice in writing to the Independent Consultant at any time that STLLC shall in its judgment decide that such termination is in the best interests of STLLC. Conversely, the Independent Consultant shall have the right to terminate this agreement upon 14 days' notice in writing to STLLC at any time that the Independent Consultant shall in its judgment decide that

such termination is in the best interests of the engineering profession. In the event of such termination, STLLC shall pay the Independent Consultant on a pro rata basis for percent of work completed as determined by mutual agreement subject to the provisions of Sections 3, 4, and 5 of this Agreement.

**11. Force Majeure.** Neither party shall be liable to the other party for any failure to perform its obligations under this Agreement if such performance is prevented or delayed by an “Event of Force Majeure.” As used herein, an “Event of Force Majeure” shall mean acts of God, war, rebellion, acts of terrorism, civil unrest, riot, governmental regulations, fire, natural disasters, earthquakes, hurricanes, tornados, floods, labor disruptions or strikes, epidemics, pandemics, quarantines or any other circumstance beyond a party’s control which such party cannot overcome through reasonable and diligent efforts which makes it inadvisable, commercially impracticable, illegal or impossible for such party to perform its obligations under this Agreement. Where there is a Force Majeure Event, the party prevented from or delayed in performing its obligations under this Agreement must immediately notify the other party giving full particulars of the Event of Force Majeure and the reasons for the Event of Force Majeure preventing that party from, or delaying that party in performing, its obligations under this Agreement and that party must use its reasonable efforts to mitigate the effect of the Event of Force Majeure upon its performance of the Agreement.

**12. Trademark Usage.** Independent Consultant may not use any of STLLC’s trademarks or other identifiers (including the STLLC logo) in any manner without STLLC’s prior written approval or consent. STLLC reserves the right to review any approved use of its trademarks and to require changes in any further use, and Independent Consultant agrees to comply with those requirements.

**13. Publicity Release and Public Affairs.** The Independent Consultant shall not make without prior review and approval of STLLC, any publicity release of any nature of general, non-technical information in connection with this Agreement. For purposes of this Agreement, general, non-technical information means any information concerning the existence of the Agreement, the identity of the parties, and the scope and general character of the research or technical activity.

**14. Entire Agreement.** This Agreement entirely supersedes, terminates, and replaces any and all prior agreements between the parties relating to the subject matter hereof and may not be amended except by an instrument in writing signed by both parties to this Agreement.

**15. Notices.** Any notices hereunder shall be given to the parties at their respective addresses set forth above by registered mail until a new and different address shall be established for either party on the basis of notice given to the other party.

**16. Governing Law.** This Agreement shall be subject to and governed by the substantive laws of the State of New York (without regard to its conflict of laws rules).

**17. Travel.** All travel has to be pre-approved by ASME STLLC for this project.

**IN WITNESS WHEREOF,** STLLC has caused this Agreement to be executed on its behalf by its officer thereunto duly authorized and the Independent Consultant has executed this Agreement as of the day and year first above written.

**ASME STANDARDS TECHNOLOGY, LLC**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Name: Steve Ferguson  
Title: President

**INDEPENDENT CONSULTANT**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Name:  
Title:  
[Federal Tax ID number] | [Social Security] | [Other]

## Annex 1 – Statement of Work

### Background

This project is about yada, yada, yada...

### Scope of Work

#### General

The objective of this project is to...

The Independent Consultant shall identify, analyze, categorize, prioritize, document, filter, extract, derive, calculate, design, procure, engineer, construct, erect, build, program, display, print-out, draw, doodle, and do other consultant-type things as follows.

- The Independent Consultant shall [\_\_\_\_\_].
- The Independent Consultant shall [\_\_\_\_\_].
- The Independent Consultant shall [\_\_\_\_\_].
- The Independent Consultant shall [\_\_\_\_\_].
- The Independent Consultant shall [\_\_\_\_\_].
- The Independent Consultant shall [\_\_\_\_\_].

#### Responsible Parties

The Independent Consultant shall be the prime contractor executing the scope of work and responsible for all deliverables. The Independent Consultant shall be responsible for the management of all work herein.

#### Phase One (if applicable)

During phase one, the problem shall be defined, yada, yada, yada... as follows.

- The Independent Consultant shall [\_\_\_\_\_].
- The Independent Consultant shall [\_\_\_\_\_].
- The Independent Consultant shall [\_\_\_\_\_].

#### Phase Two (if applicable)

During phase two, the problem shall be solved, yada, yada, yada... as follows.

- The Independent Consultant shall [\_\_\_\_\_].
- The Independent Consultant shall [\_\_\_\_\_].
- The Independent Consultant shall [\_\_\_\_\_].

#### Deliverables

The Independent Consultant shall prepare, submit, and finalize the following deliverables:

- A detailed test protocol identifying all proposed test methodologies and reference methods.
- A detailed test report identifying test methodologies used and reference methods, raw test data, and preliminary data analyses.
- A detailed draft report that summarizes the scope of work and includes all of the previously-referenced scope of work items, correlated, with graphics and examples included to support explanations.

For the previously-identified deliverables, STLLC will review such deliverables as well solicit additional comments from ASME and its Peer Review Group (PRG), after which STLLC will provide all such comments consolidated to the Independent Consultant. For all such reviews and commenting, one peer review cycle per deliverable is anticipated.

- The Independent Consultant shall address and resolve all comments from STLLC, ASME, and ASME’s PRG, and incorporate such comments into a final report, after which STLLC, ASME, and ASME’s PRG will assess that such comments have been satisfactorily addressed by the Independent Consultant.

Schedule

The Independent Consultant shall perform the scope of work herein pursuant to the following schedule.

Project Schedule			
Item	Draft Deliverable	Final Deliverable	Milestone Date
Notice to Proceed (“NTP”)	--	--	TBD
Kickoff Meeting via teleconference	--	--	TBD
Test Protocol	2 weeks after NTP	2 weeks from receipt of STLLC comments	TBD
Test Report	4 weeks after NTP	2 weeks from receipt of STLLC comments	TBD
Phase I Summary Presentation	6 weeks after NTP	2 weeks from receipt of STLLC comments	TBD
Phase II Summary Presentation	8 weeks after NTP	2 weeks from receipt of STLLC comments	TBD
Other	10 weeks after NTP	2 weeks from receipt of STLLC comments	TBD
Draft Report	12 weeks after NTP	2 weeks from receipt of STLLC comments	TBD
Final Report	14 weeks after NTP	2 weeks from receipt of STLLC comments	TBD

### Status Reporting

The Independent Consultant shall provide a brief monthly status report, via email, to the STLLC Project Manager, Ms. Project Manager, at [ManagerP@asme.org](mailto:ManagerP@asme.org). The Independent Consultant shall provide an initial status report within 30 days of contract execution date. For all status reports, the Independent Consultant shall identify: activities underway, planned, and completed; any unforeseen problems; and any anticipated delays to the project schedule.



**Annex 2 – Financial Terms**

**Fees and Expenses**

Contract Maximum: Fixed price of \$XXX,000 including all expenses.

**Invoicing & Payment**

The Independent Consultant shall submit invoices for applicable milestone payments achieved to STLLC via email to [AccountsPayable@asme.org](mailto:AccountsPayable@asme.org) with an email copy the STLLC Project Manager.

Project Milestone Payments				
Item	Draft Deliverable	Final Deliverable	Milestone Date	Milestone Payment
Notice to Proceed (“NTP”)	--	--	TBD	\$000
Kickoff Meeting via teleconference	--	--	TBD	\$000
Test Protocol	2 weeks after NTP	2 weeks from receipt of STLLC comments	TBD	\$000
Test Report	4 weeks after NTP	2 weeks from receipt of STLLC comments	TBD	\$000
Phase I Summary Presentation	6 weeks after NTP	2 weeks from receipt of STLLC comments	TBD	\$000
Phase II Summary Presentation	8 weeks after NTP	2 weeks from receipt of STLLC comments	TBD	\$000
Other	10 weeks after NTP	2 weeks from receipt of STLLC comments	TBD	\$000
Draft Report	12 weeks after NTP	2 weeks from receipt of STLLC comments	TBD	\$000
Final Report	14 weeks after NTP	2 weeks from receipt of STLLC comments	TBD	\$000
<b>Project Total</b>				<b>\$XXX,000</b>

STLLC will make milestone payments to the Independent Contractor when each of the following milestones are completed and accepted by STLLC, and STLLC has received the aforementioned applicable milestone payment invoice properly submitted.