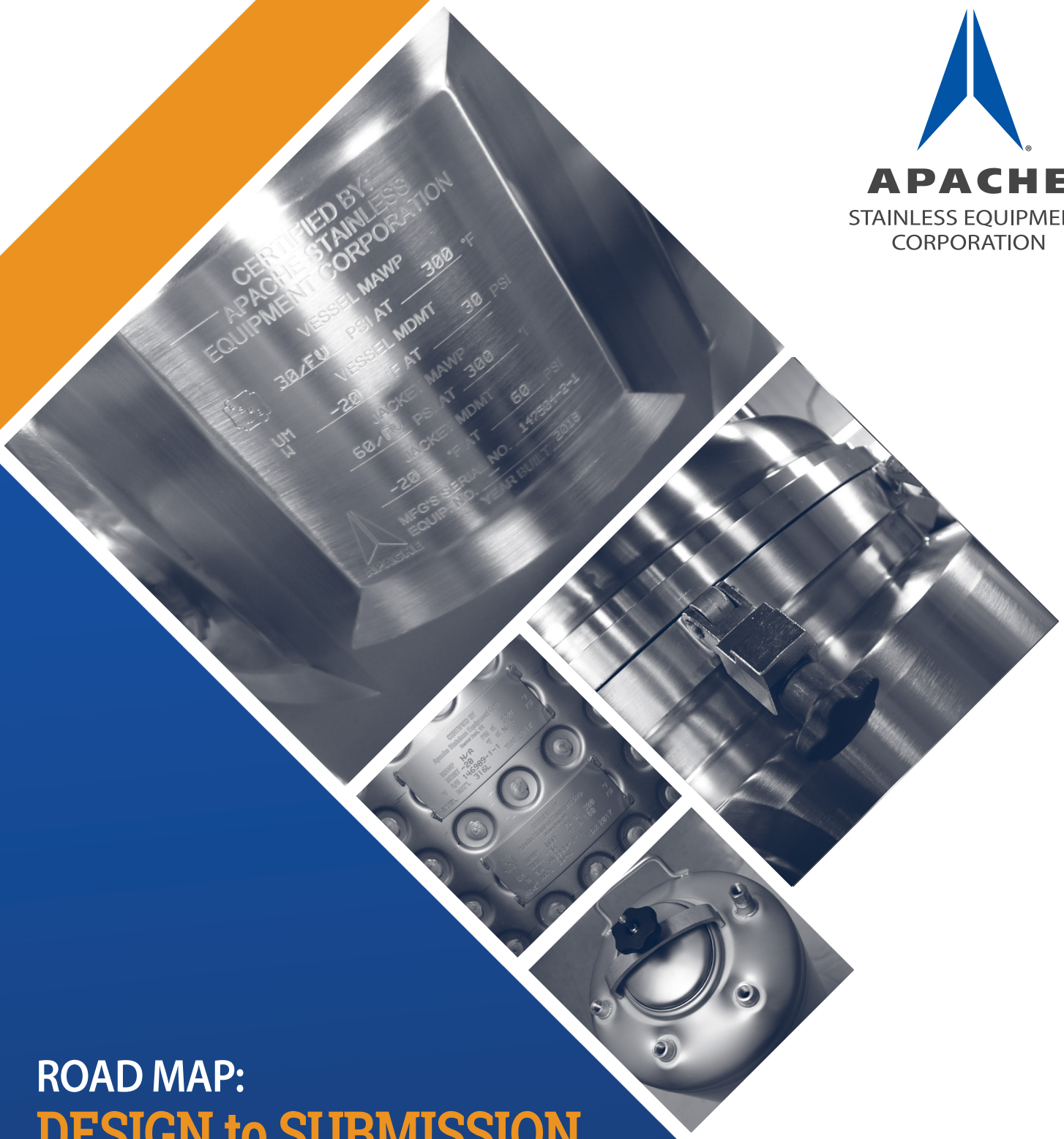
APACHE
STAINLESS EQUIPMENT
CORPORATION



ROAD MAP:
DESIGN to SUBMISSION
for Custom ASME Vessels

DESIGN to SUBMISSION for Custom ASME Vessels

As a manufacturer of custom vessels for pharmaceutical, life sciences, and health industries, Apache works with integrators who add their process technology to equipment, as well as end-users who know their process and need a compliant vessel solution.

The stages for custom vessel development and compliant design are outlined below. Whether you are a beginning or experienced engineer, or a purchasing professional, this road map will give you planning insight and knowledge to acquire custom-designed and manufactured ASME and other certified vessels.

CONCEPT REVIEW

In the initial project discussion, Apache provides a consultative review to learn:

- Overall expectations
- Interpretation of drawings/sketches
- Understanding customer's processing goals for the vessel
- Compliance and certifications required
- Engineering consultation if needed

The outcome of the design review is a clear understanding by both parties of the project expectations. Part of this technical review includes in-depth communications around the ASME and other compliance criteria for the vessel. Understanding these details in the concept review stage helps discover design details early-on to avoid late-stage revisions or scope change, which affects cost and timing.

Depending on the project's complexity, the review may include engineering team support to determine the viability of the project.

SPEC DEFINITION

Whether via phone, email communications, or web conference, the development of specifications is a back-and-forth collaboration between the customer, sales, and ASME engineers. The engineering team is formally involved at this stage to define the exact details of the vessel. Specification development includes physical component identification, construction details, finishing requirements, and defined attachments and instruments. Depending on the project, engineering may perform calculations to confirm the design and process goals. The spec definition will give the customer and manufacturer a thorough outline of all compliance processes.

WRITTEN PROPOSAL

The written proposal includes the scope, specifications, and timeline for the vessel project. Some customers are required to seek RFPs (Request for Proposal) from multiple vendors, so Apache's proposals are compiled to mirror customer requirements and data sheets to allow for easier review.

While it may require a few days to complete, a detailed quote reduces ambiguity and variables that can lead to misunderstandings in the project. Using language that serves the customer also helps bridge communication gaps to solidify the project expectations.

In more complex projects, Apache may provide a formal concept drawing with the written proposal. This visual helps to resolve the design direction and compliance, as well as emulate the proposal.

SCOPE ALIGNMENT

The scope alignment process allows for confirmation of the proposal and services included in the project and to clarify items out of scope. Some proposals require minor changes after scope review, and some require more significant variations. Scope alignment tasks:

- Modify quote to revisions/changes
- Verify manufacturing capacity
- Confirm due dates and delivery, including milestones or project schedule
- Review component pricing
- Discover component lead-times
- Review of customer approval process and timeliness
- Review project engineering expectations
- Provide ASME / certification time-lines
- Confirm deliverables
- Review terms and conditions

APPLICATION
Purpose & Industry
CONSTRUCTION
Capacity
Design Pressure
Vacuum
Temperature
Material
Top Head Type & Fittings
Bottom Head Type & Fittings
Supports
FINISH
Interior Material
Interior Welds
Exterior Material
Exterior Welds

FUNCTION
Heating or Cooling
Insulation & Cladding
AGITATION
Pneumatic / Electric
Product Viscosity
Desired Mixing Action
Presence of Solids
Preferred Impeller Style
Motor Voltage / Classification
Seal Type

ORDER

After the customer has chosen the preferred partner as Apache Stainless, we receive the PO (Purchase Order). We also review variations and changes to reconcile the purchase order to the proposal.

Behind the scenes, the order is entered into our scheduling and enterprise systems. A project engineer is then assigned to the project and engineering meetings are scheduled.

PROJECT ENGINEERING

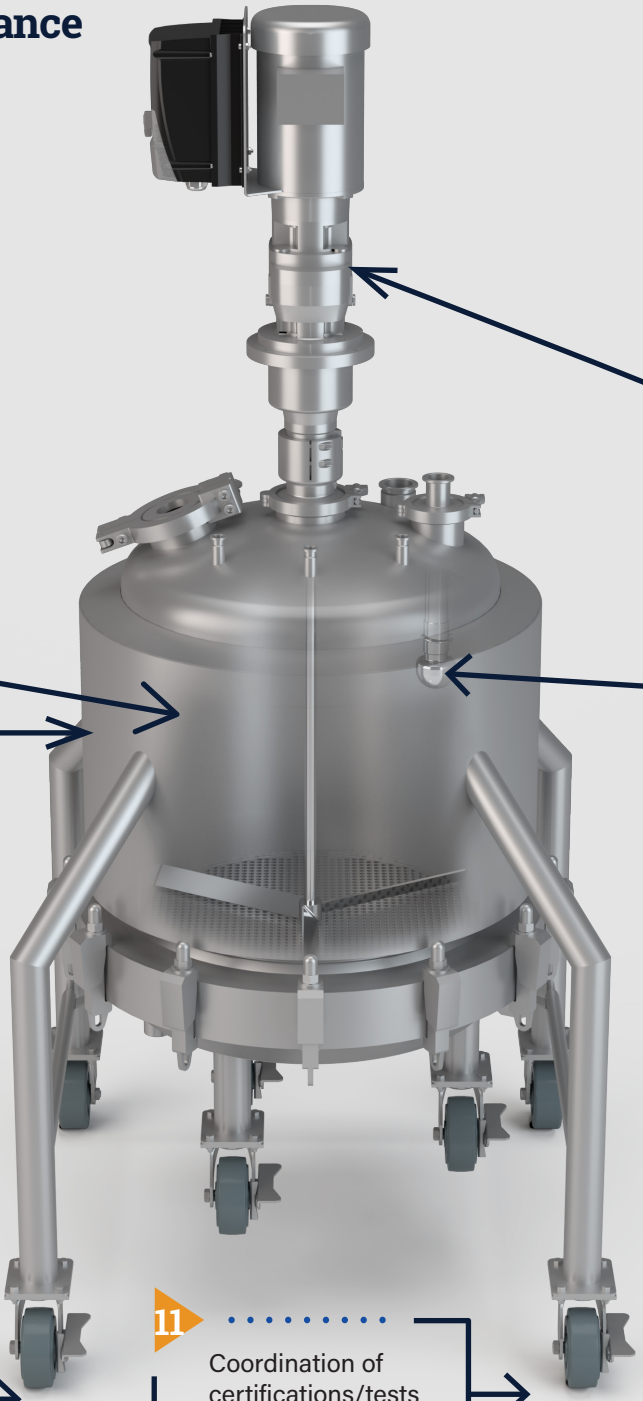
The final stage of the ASME design submission process is Project Engineering. At this stage, there is a kick-off and a sales-to-engineering release review. Sales works closely throughout the engineering process to coordinate and relay information to the customer. Project engineering includes:

- Order long-lead purchased components
- Technical confirmations with customer
- Run / verify calculations
- Completion of 3D ASME / PED / CRN compliant design
- Vendor component direction and collaboration
- Approval review with customer
- Submission of compliant design for ASME or other faction approval
- Detailed drawings for the manufacturing process
- Coordination of certifications / tests
- TOP (Turn-over packet) deliverables as required

About Apache Stainless

The Apache Stainless Equipment Corporation is a compliance engineering and manufacturing company that provides stainless equipment for a range of industries. Apache's tanks and vessels showcase our sanitary and compliance capabilities in the beverage, life sciences, energy, bio-technology, pharmaceutical, and food processing industries.

12 Project Engineering Steps to Ensure Vessel Compliance



1. Understand the intent of the vessel
2. Ensure and verify design conditions: process, temperatures, ASME, compliance, calculations
3. Determine finish requirements: mechanical, electro-polishing, access for fixtures, impact on fittings, design
4. Final calculations to address issues, verify material thickness and fit of fittings
5. Completion of 3D ASME/PED/CRN compliant design
6. Order long lead time components: Mixer, body flanges, heads
7. Collaborate with component manufacturer for custom specifications and process requirements
8. Customer approval process, providing 2D, 3D models, collaboration of changes, final approval
9. Submission of compliant design for ASME (or other faction) approval
10. Detailed drawings for the manufacturing process
11. Coordination of certifications/tests
12. TOP (Turn-Over-Packets) as required

Marketing/Resources/Design to Submission

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