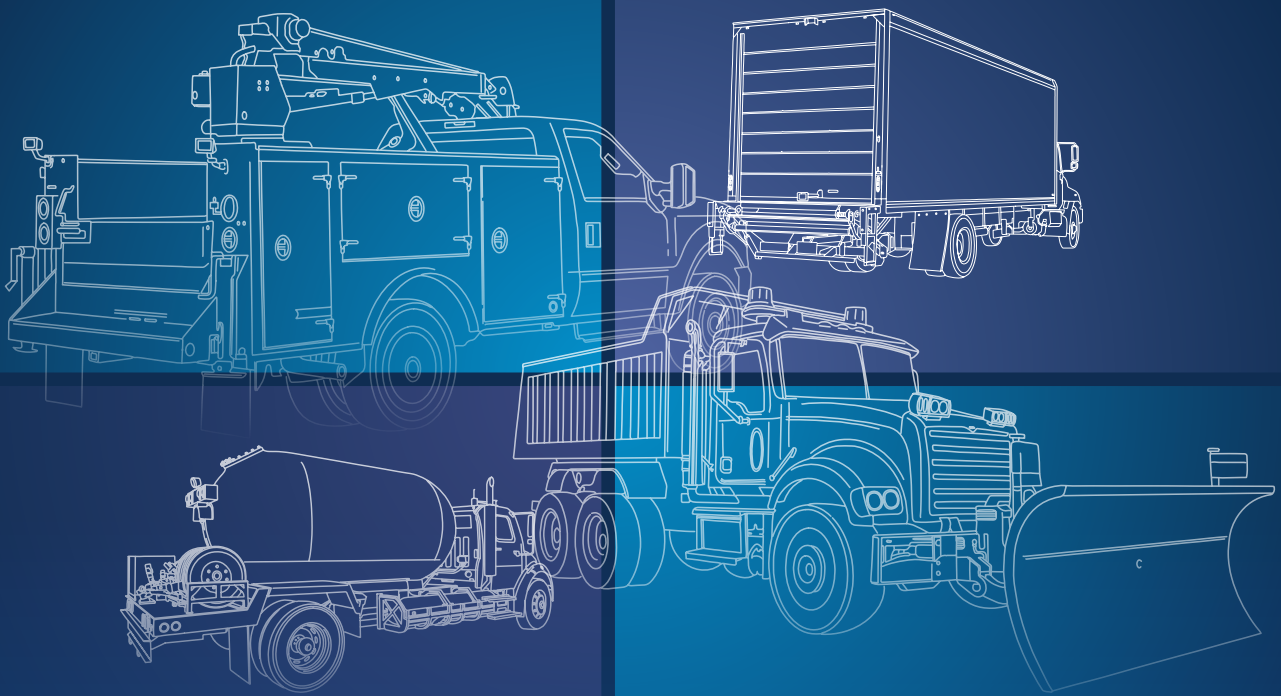


Vehicle Specification Process Guide



Building better trucks through
collaboration and data

NTEA
THE WORK TRUCK ASSOCIATION

INTRODUCTION

Creating effective commercial vehicle specifications for today's increasingly complex equipment requires a multifaceted approach that involves input and participation from various stakeholders. Key parties include the vehicle user, fleet team and supply chain — comprised of chassis OEMs, truck dealers, body and truck-mounted equipment companies, vehicle upfitters, and fleet management companies. The specification development process encompasses a systematic and defined set of interactions between these stakeholder groups.

This specification development tool is intended to improve the process by applying leading techniques, with processes widely recognized by industry professionals. For those experienced in the industry, it can serve as a guide — a checklist approach to confirm that established processes are followed. It's designed to help ensure a predictable and well-crafted final product each and every time.

Development of commercial vehicle specifications is a complex process that must be a collaboration between these stakeholder groups. The role of the specification writer is critical and possibly the most difficult to articulate as it could be filled by any of the stakeholders that were previously identified. At times, this critical role can be appropriately undertaken by the fleet manager, truck dealer, upfitter or fleet management company. In the specification process, it is essential to properly identify where the specification writer resides in the value chain as that individual or team is responsible for assimilating the inputs from the remaining stakeholders.

Fleet managers and vehicle users need to define vehicle characteristics for the specification writer to ensure the mission of the vehicle (work) can be safely and efficiently executed. For proper specification development, the specification writer needs to effectively relay any regulatory concerns and relevant safety characteristics with users and other stakeholders as these factors contribute to defining the final product. The specification writer also needs a clear understanding of relevant work methods and tasks this equipment will be expected to support.

Familiarity with applicable regulatory compliance requirements, safety considerations and optimized vehicle design will be significant contributing factors for the specification writer. They also need to understand market offerings for the relevant specifications being written.

OEMs and upfitters involved in the specification process must have a clear view of the end user's defining mission characteristics and work methods. Elements for proper specification development include geographic use, power demands (related to both drivetrain and export power), and details like crew size, payload expectations, and regulatory requirements. Fundamentals for safe use of equipment need to be built into the specification during the activity planning phase at the start of the design period. To the greatest extent possible, characteristics that prevent equipment misuse are a priority in the design phase.

Some types of very specialized equipment are not purchased in enough volume for the fleet team to invest in the specification development process. And, as with specifications common across the market, the buying community may often rely on the supply chain for specifications rather than developing their own.

Specifications are often categorized in three types.

- **Engineering specifications** — Detailed specifications that identify construction specifics, including materials used, and can include CAD drawings.
- **Performance specifications** — Refer primarily to the product's role in supporting user missions. These specifications provide the builder some latitude on how the product will accomplish performance goals and can lead to growth of innovative solutions/equipment builds.
- **Proprietary specifications** — Typically have a characteristic (or combination of characteristics) that only one supplier can provide. While there may be excellent reasons for a proprietary specification, we recommend that, in addition, the user prepare a sole source justification that can help the specification writer avoid concerns about vendor bias. If sole source is not the goal, it's recommended that an equivalent be added to the proprietary elements, allowing others to offer solutions.

INTRODUCTION

The intention of this guide is to outline a process that can help identify critical factors that should be considered when creating or revising vehicle specifications. This process will also provide guidance for determining the optimal frequency of specification revision where the specification writer should capitalize on field experience and take advantage of new products and technological advances available in the marketplace to enhance vehicle productivity and safety. Even for vehicles where the market still offers essentially finished products available straight from dealer inventory, a review may reveal new offerings that can improve efficiency and effectiveness.

Following the process in this guide should ensure the vehicle specification is well aligned with the application and meets the needs and expectations of the truck buyer or fleet organization. On the supply side, this guide offers insight into the process a fleet manager/buyer can use to ensure the truck best meets user needs and objectives. In addition, it can serve as a resource to provide common ground for stakeholders to see where their expertise relates to the process.

Effective specifications provide the foundation for vehicle optimization which has widely recognized virtues for managing overall costs and improving both reliability and user safety. In addition, consistent specifications may also provide for procurement efficiencies within the supply chain. It's worth noting that not all vocational vehicle applications allow for significant standardization. Examples include one-of-a-kind vehicles and those replaced over periods of significant change being made to available products. Regardless, specifications allow for effective equipment design, construction and procurement. Some typical equipment types are often purchased without formal specifications (i.e., passenger cars and light trucks) due to the common types of product offerings. The more complex the equipment and more robust the mission requirement, the more important detailed specifications become.

Keep in mind, not every specification needs to be revised routinely. If mission needs remain consistent and available products on the market are not evolving frequently, specifications do not necessarily demand change.

Regardless of the need to revise specifications, a routine review of your mission requirements and supporting products is a practice that ensures matching user needs and missions with the best available options on the market. This is your opportunity to consult with user groups and review the newest technology with them, sharing existing fleet maintenance history with an eye for improving either the equipment-to-mission match and/or fleet reliability.



Please note the color legend depicted along the page footers, which identifies the key stakeholder groups involved in each step of the vehicle specification process and clarifies their roles.

- **FLEET MANAGER** represents activities led by fleet management, including planning, evaluation, decision-making and overall specification development.
- **SUPPLIERS** reflects engagement from chassis OEMs, dealers, upfitters and equipment manufacturers who provide technical expertise, product options and integration support.
- **VEHICLE USER** highlights input from vehicle operators and end users who define mission requirements, performance needs and practical application considerations.
- **EXTERNAL SOURCE DATA** identifies outside resources such as regulatory requirements, industry standards and third-party data that inform safe, compliant and effective specifications.
- **NTEA TOOLS** indicates available NTEA resources and tools that assist in building accurate, compliant and optimized vehicle specifications.
- **SUPPORTING REFERENCES** include additional materials, guides and documentation that provide context, validation and deeper insight throughout the process.

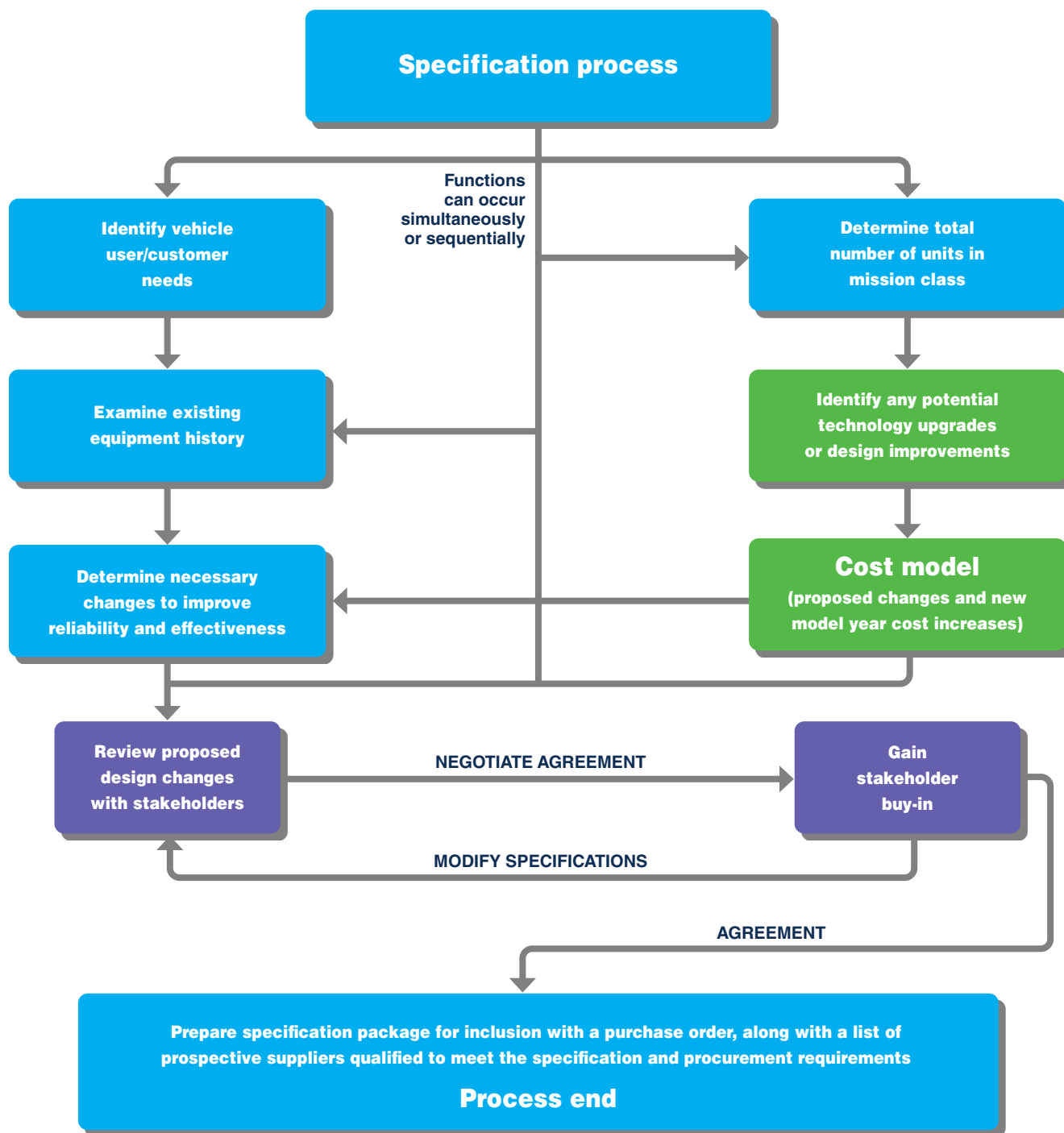
Together, these groups ensure a collaborative, informed and structured approach to developing effective vehicle specifications.

OVERVIEW

Use available industry tools to conduct comparisons and product evaluations for insight into reliability and effectiveness.

Examples

- Argonne National Laboratory's AFLEET
- National Renewable Energy Laboratory's fleet DNA tool
- NTEA Tools & Resources (see page 16)



FLEET
MANAGER

SUPPLIERS

VEHICLE
USER

EXTERNAL
SOURCE DATA

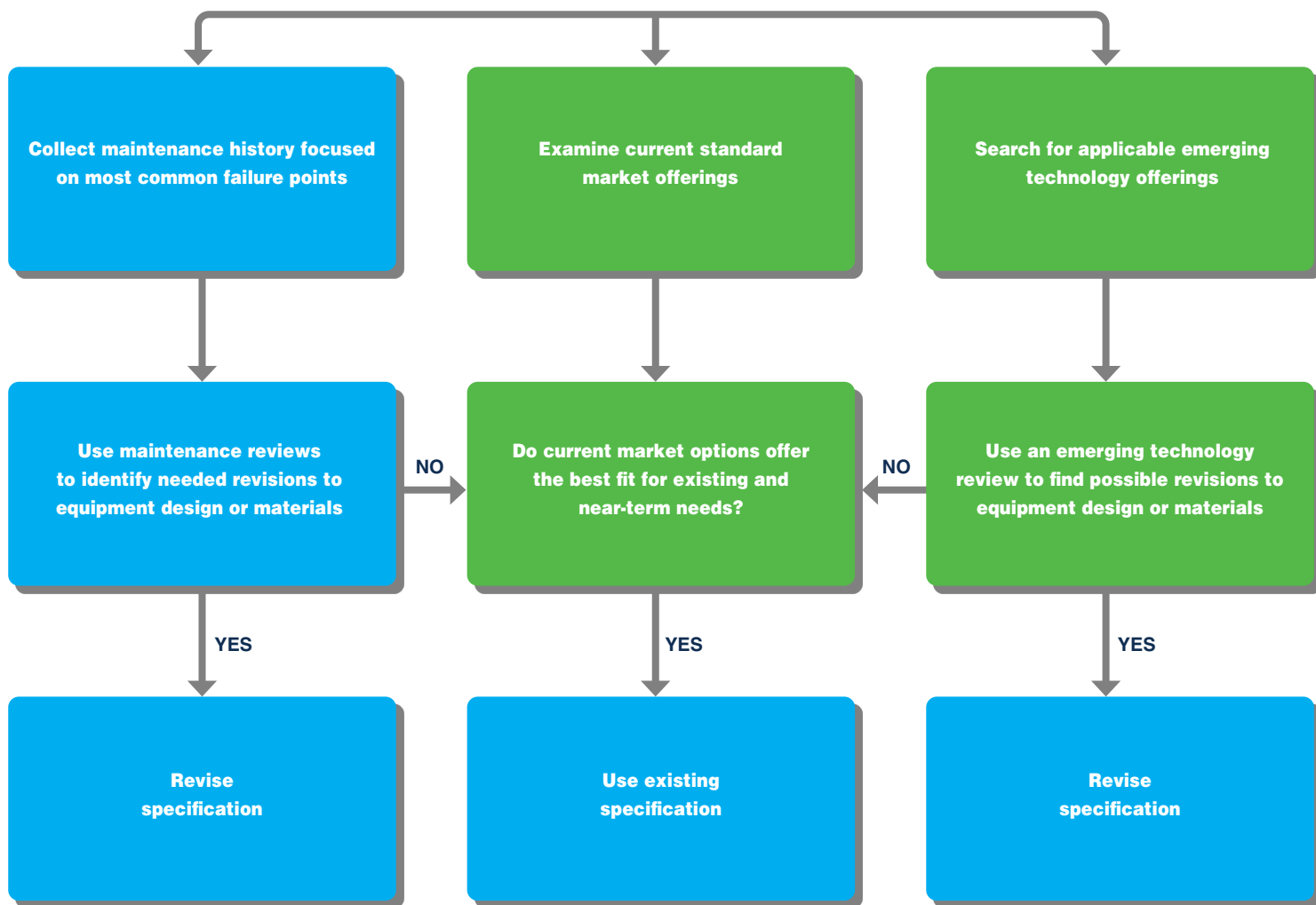
NTEA
TOOLS

SUPPORTING
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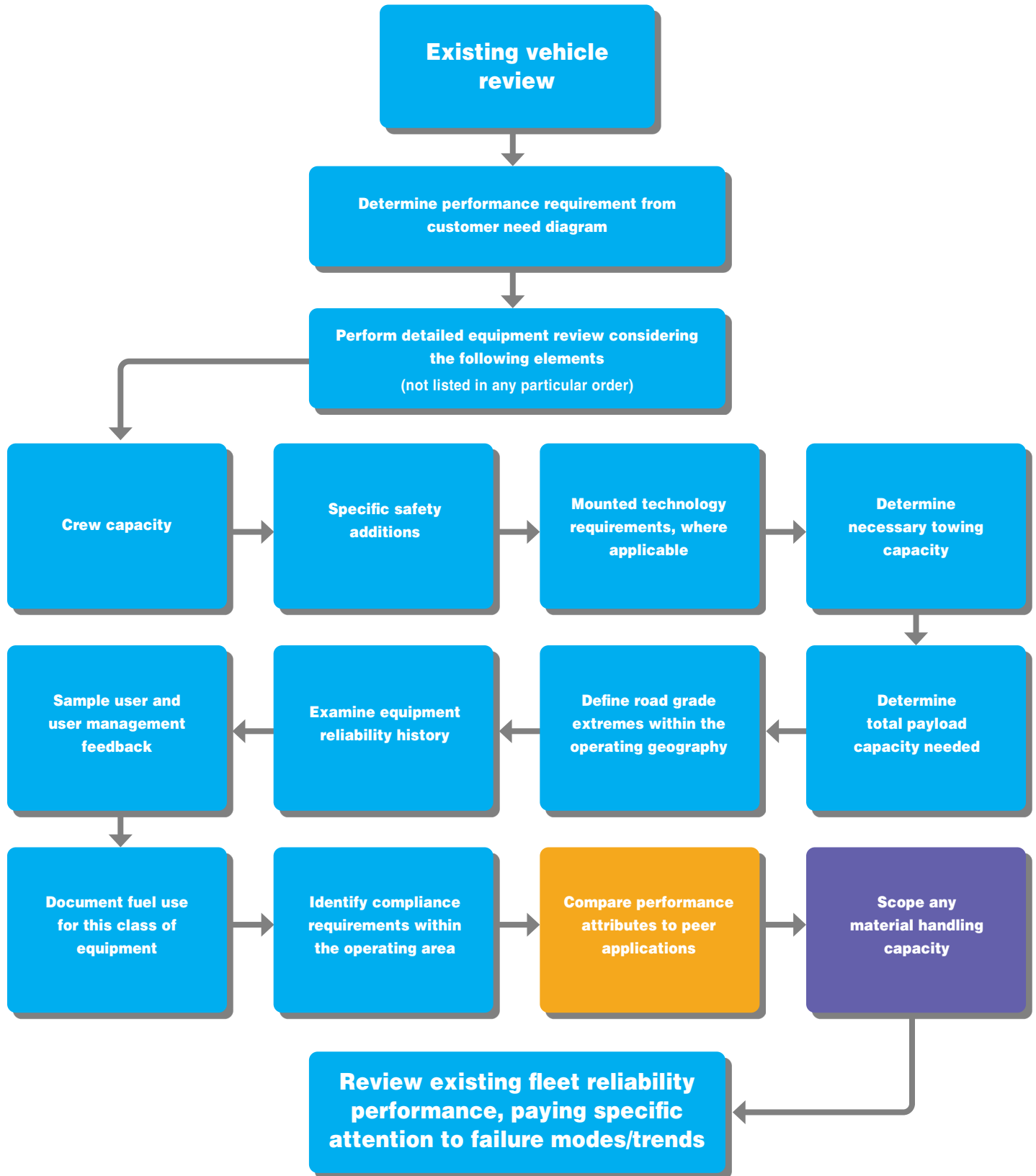
CUSTOMER NEED PROCESSES

Routine meetings between fleet managers, vehicle users and suppliers (generally prior to budgeting for the coming purchase cycle) are critical to the specification process and identifying the mission capabilities needed for the vehicle. This process helps to identify potential changes in vehicle utilization and determine needs for new technology, safety features, or vehicle mounted equipment. Ultimately, the goal is to optimize the vehicle specification to meet the operating needs of the fleet in the most cost-effective way. Many of these steps and processes can be accomplished simultaneously.

Meetings between fleet managers, vehicle users and suppliers



EQUIPMENT RELIABILITY & EFFECTIVENESS



FLEET
MANAGER

SUPPLIERS

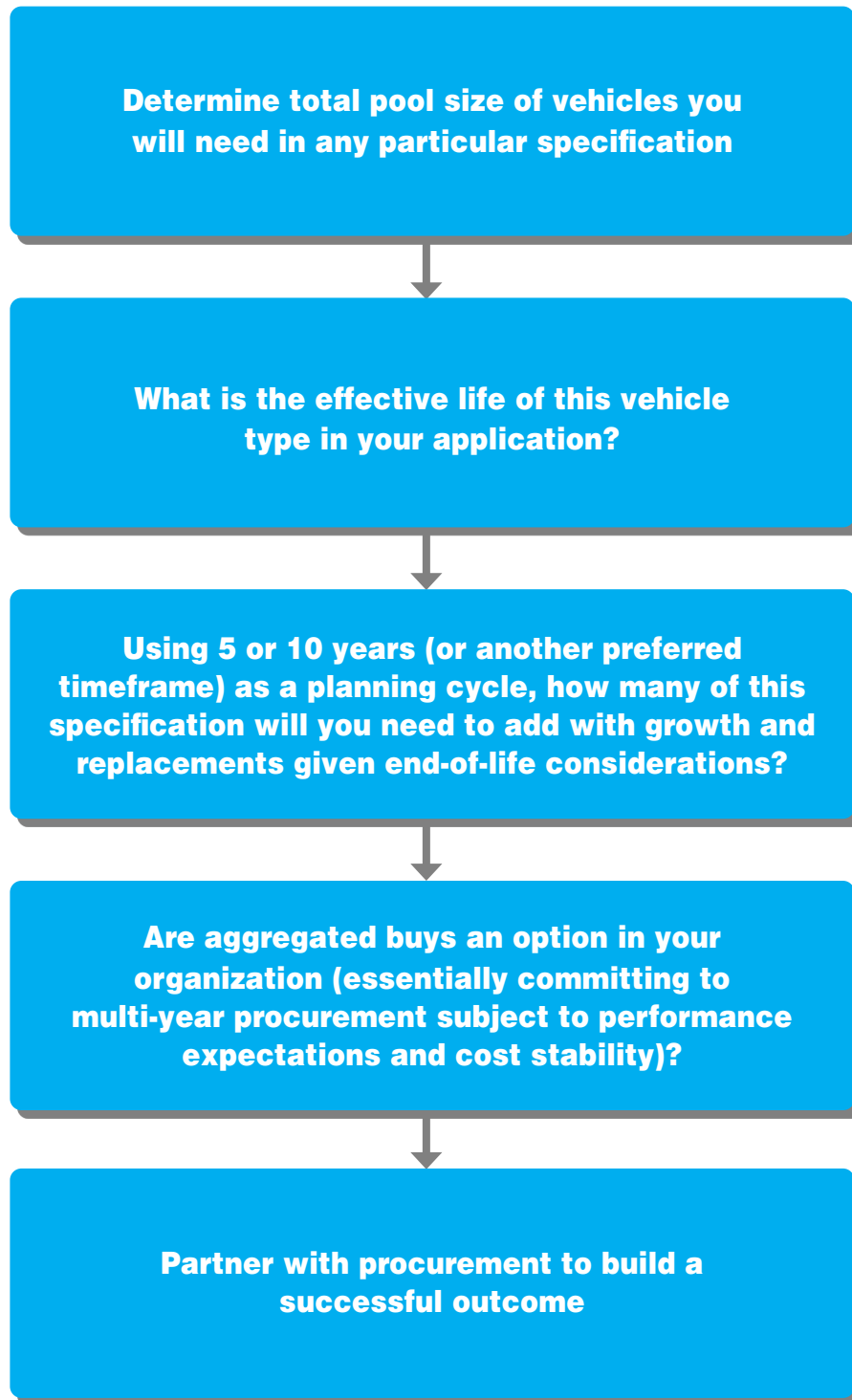
VEHICLE
USER

EXTERNAL
SOURCE DATA

NTEA
TOOLS

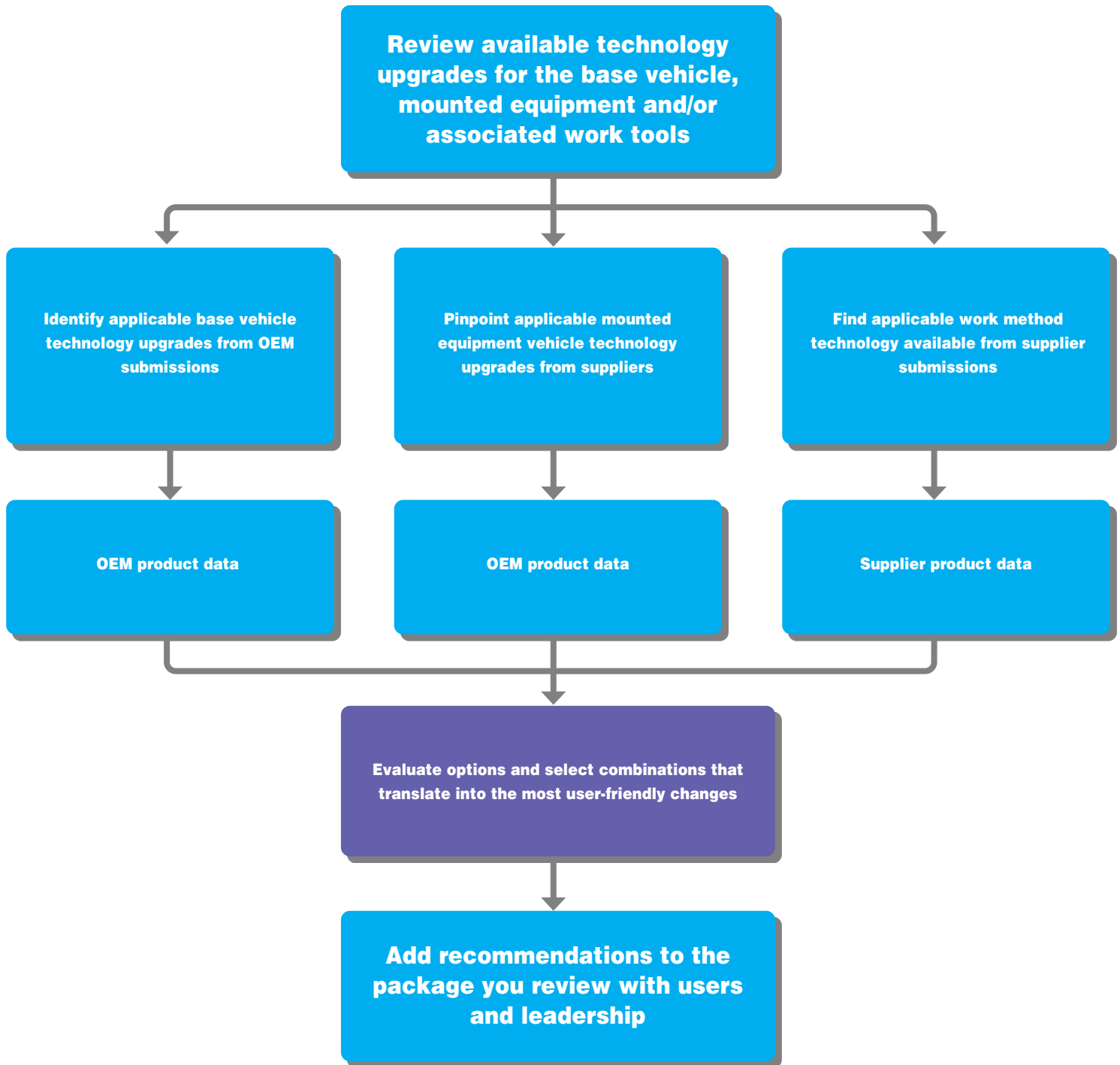
SUPPORTING
REFERENCES

SPECIFICATION POOL SIZE PROCESS



For large-volume orders, fleet managers may want to consider implementing a structured validation approach prior to full deployment of vehicles. This may include piloting a limited number of units in real-world operating environments, gathering end-user feedback over a defined period, and incorporating lessons learned to refine specifications before making significant capital commitments.

TECHNOLOGY & EFFECTIVENESS PROCESS



FLEET
MANAGER

SUPPLIERS

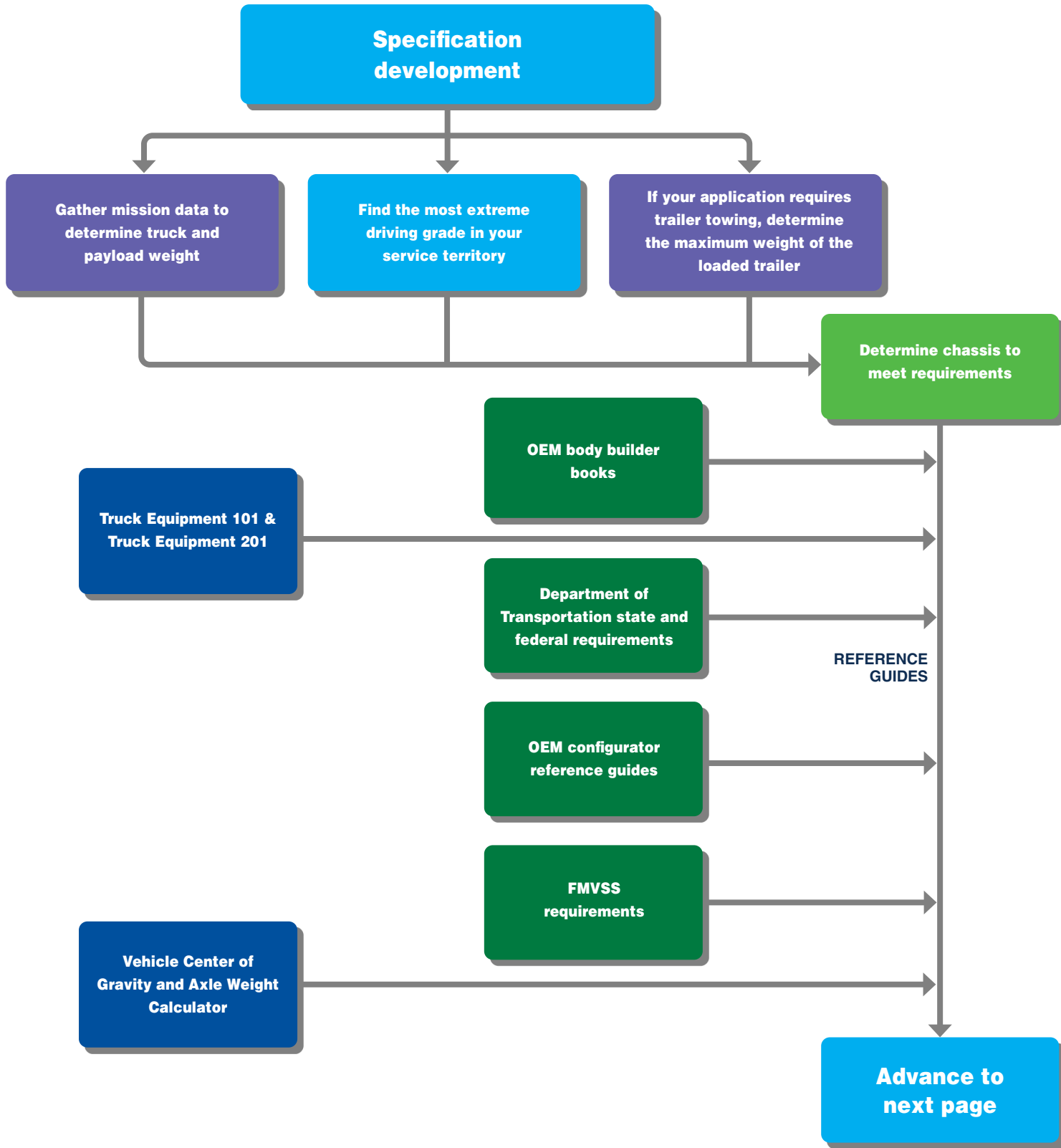
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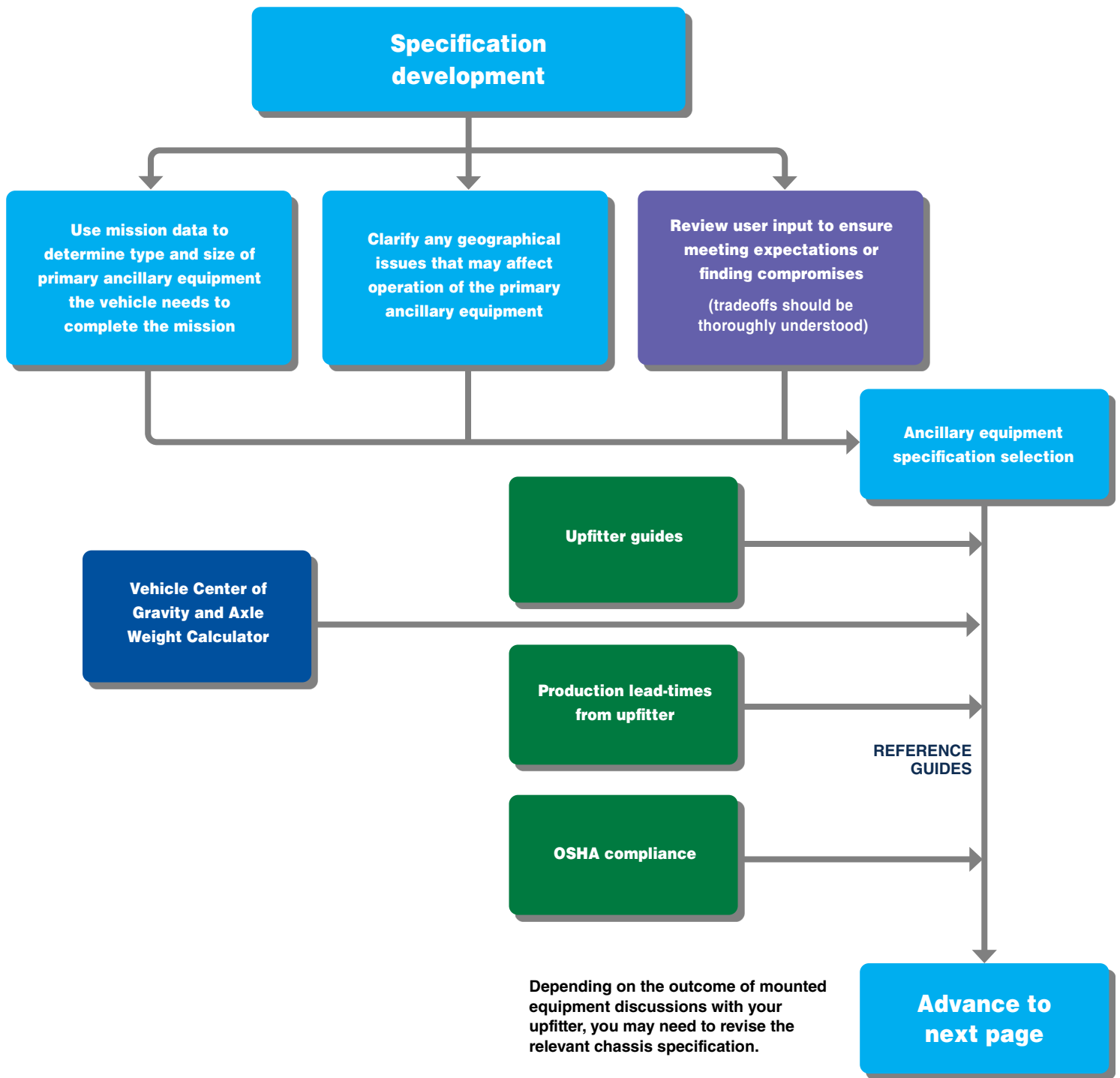
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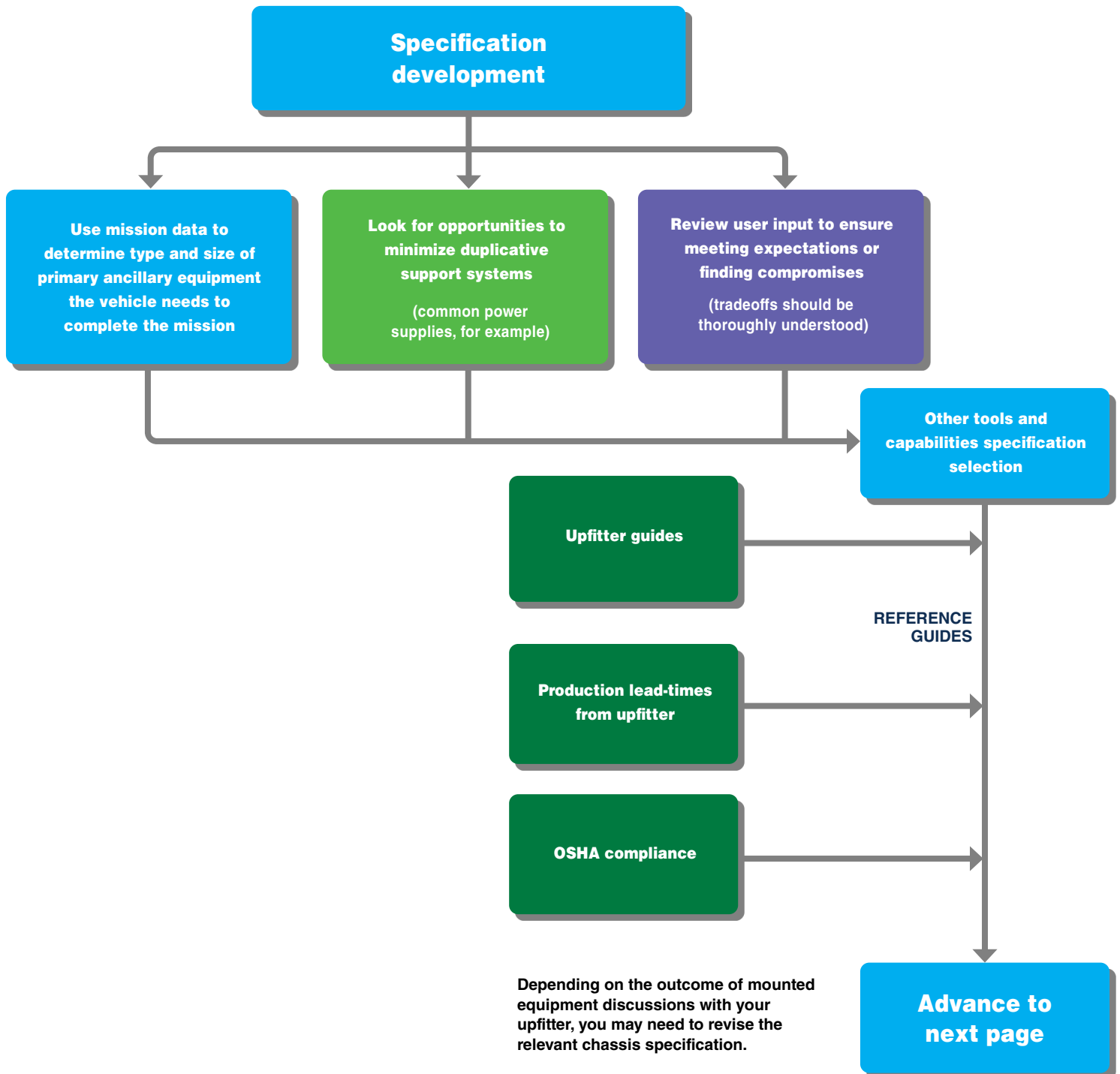
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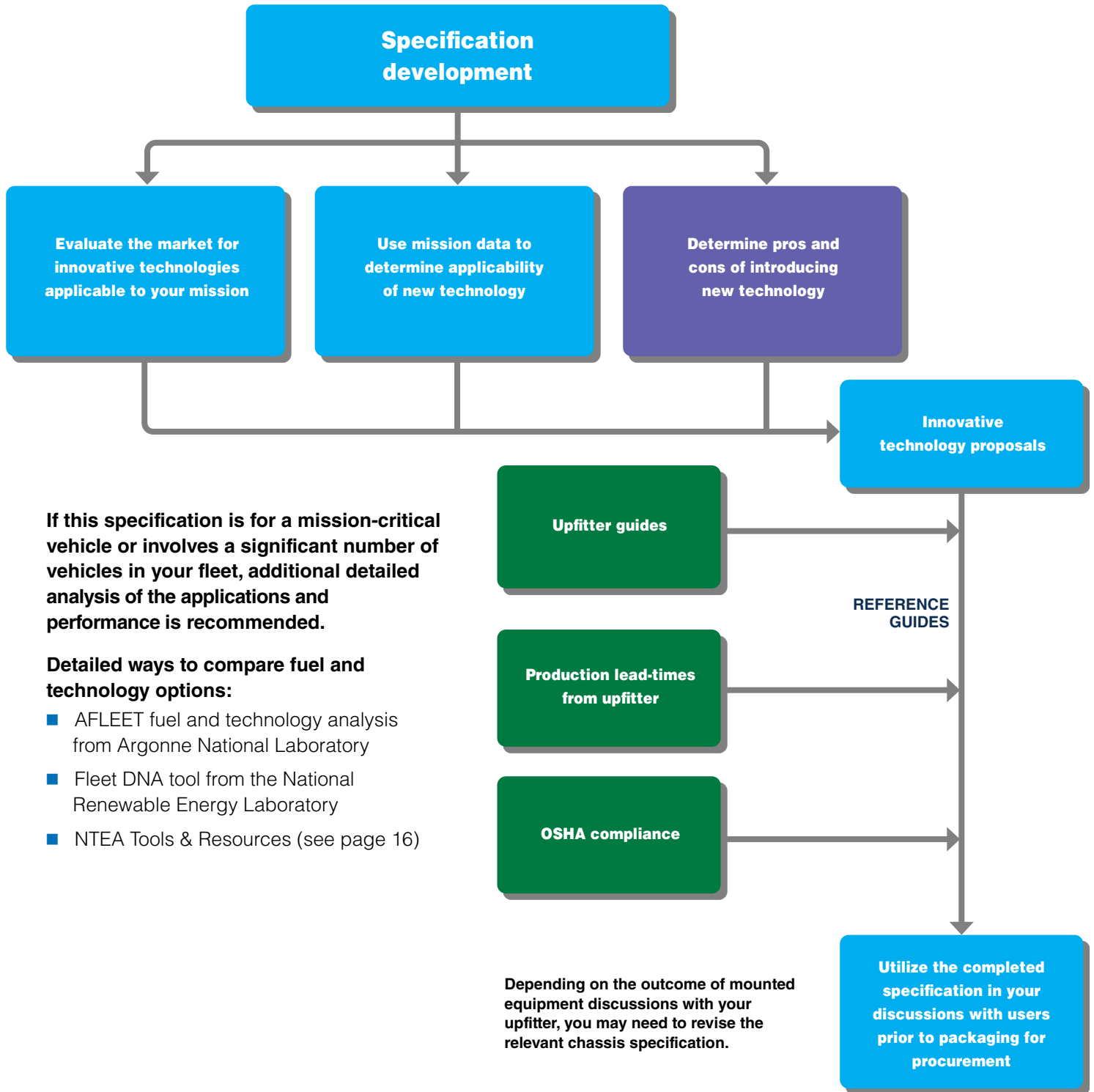
CREATE SPECIFICATION: MOUNTED EQUIPMENT



CREATE SPECIFICATION: OTHER TOOLS AND CAPABILITIES

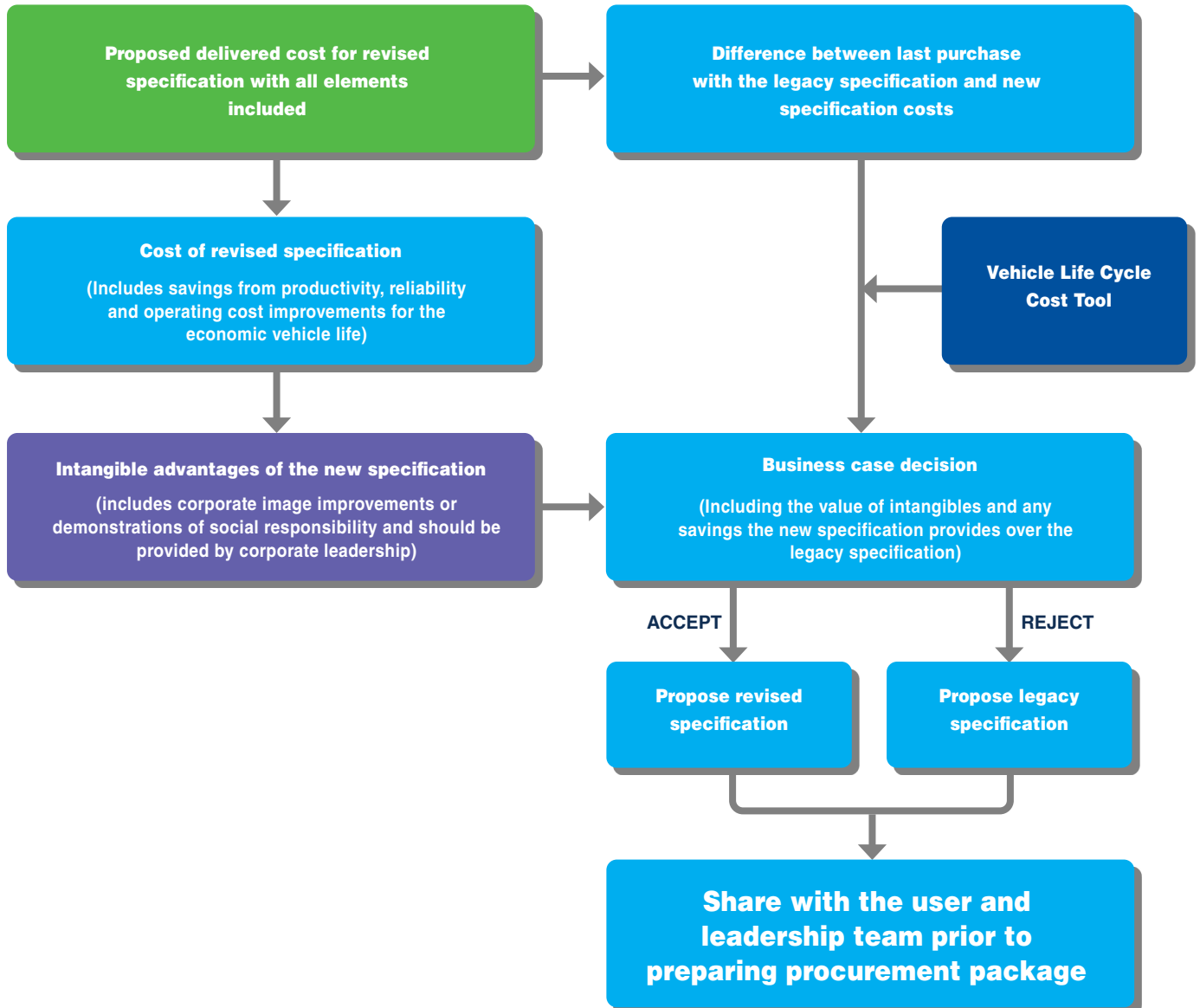


CREATE SPECIFICATION: PROPOSED INNOVATIVE SOLUTIONS



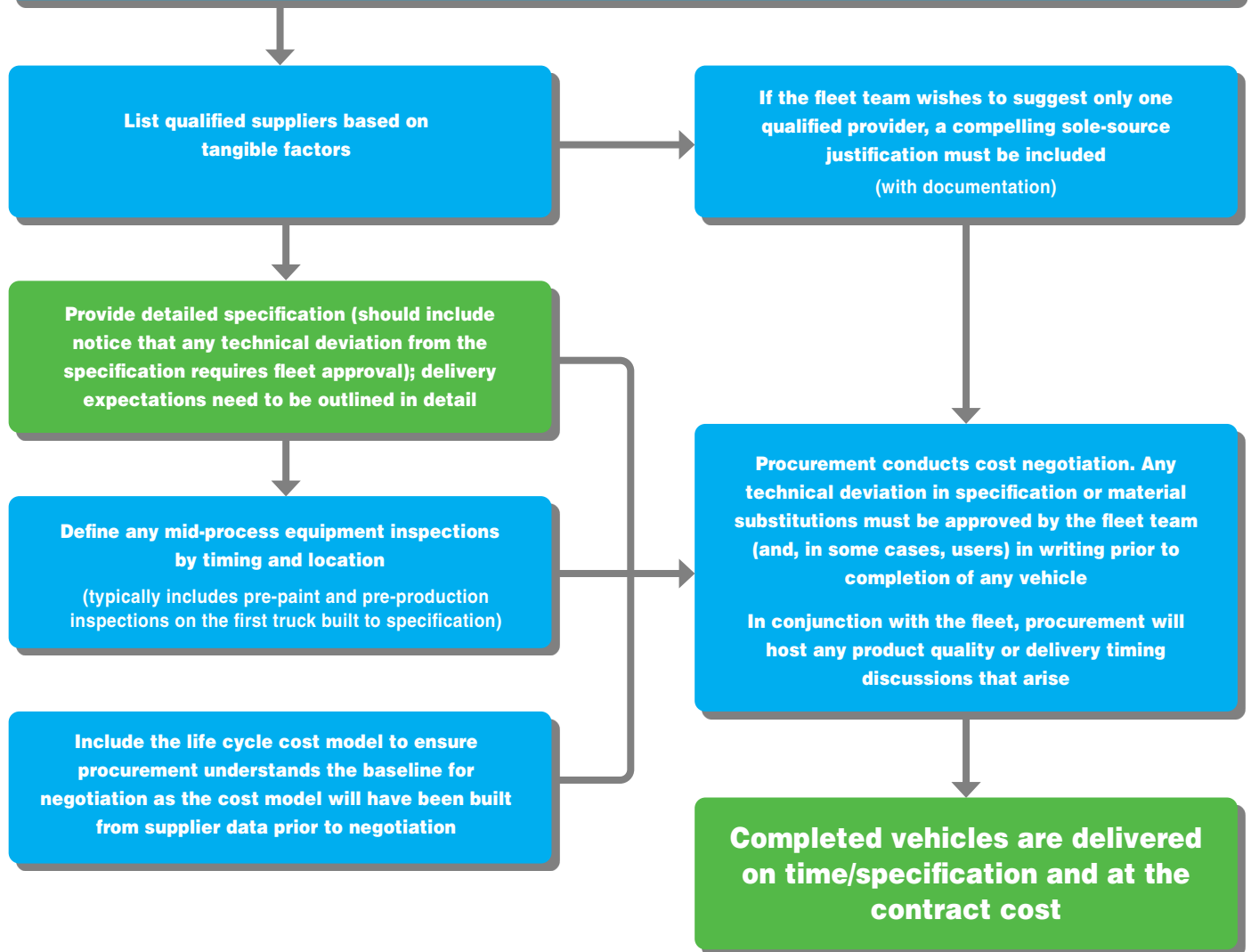
COST MODEL NEW SPECIFICATION PROCESS

Life cycle cost analysis modeling is a process to develop value profiles between specification choices. When using a specification without significant revisions, the comparison is between the current purchase cost for this specification and payment for the equivalent specification in prior years. NTEA's Vehicle Life Cycle Cost Tool provides methodology to look at total cost of ownership, allowing better long-term decisions.



PREPARE SPECIFICATION PACKAGE FOR PROCUREMENT

After the final user review (all stakeholders included) and agreement, a package must be prepared for procurement. Partnering with the procurement team is an essential step in protecting the organization, ensuring ethical behavior and transparency with the supplier community and proper contract language so the delivered product meets necessary specifications. Well-written procurement contracts also contain protections for the organization with defined penalties/remedies for failure to comply with specifications and missed delivery commitments. A procurement package should contain all of the following elements.

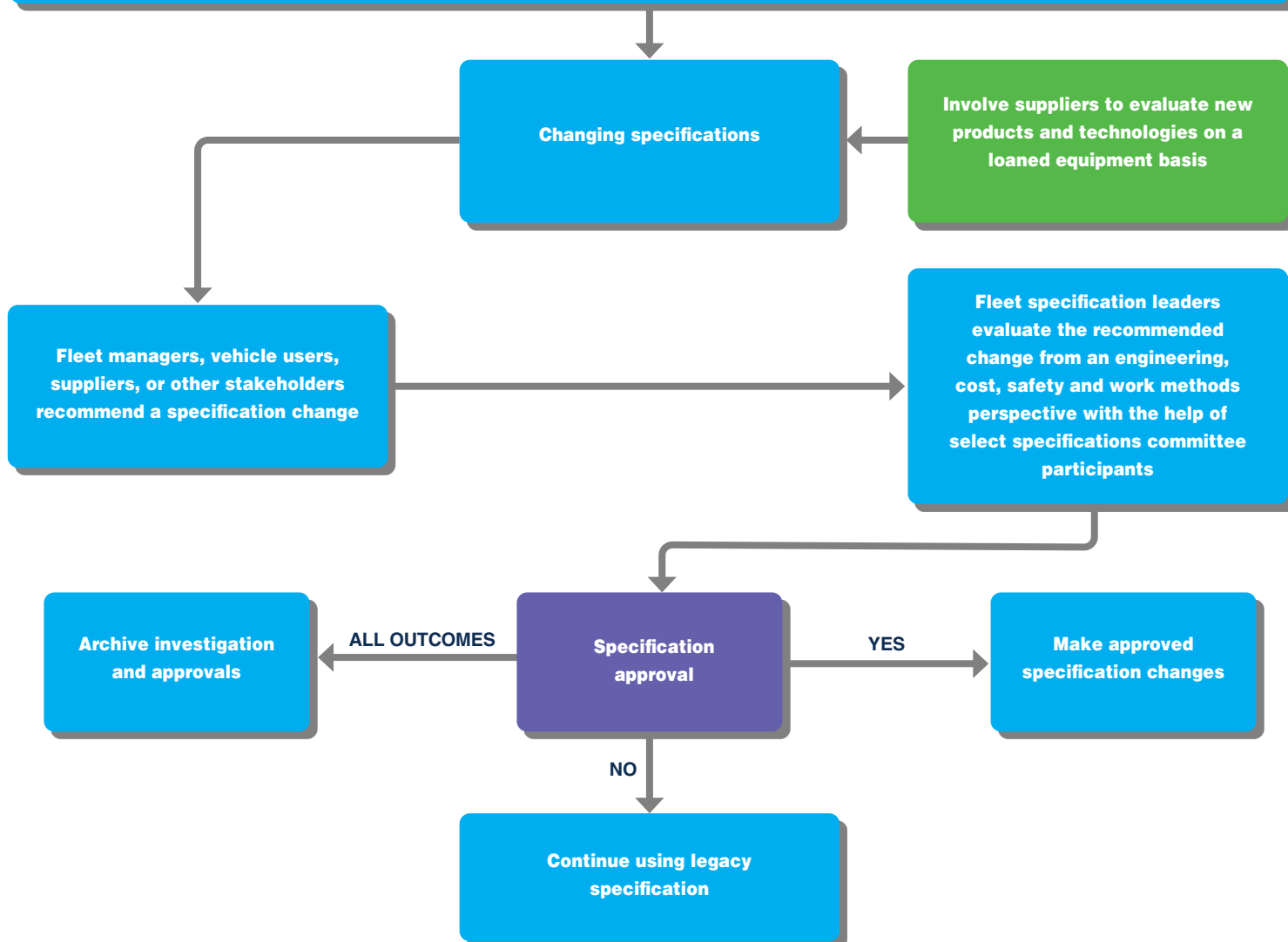


MANAGEMENT CONSIDERATIONS

Standardized specifications have proven to be powerful and effective. They improve safety results, decrease costs and simplify production. However, the fleet world is continuously evolving and improving, and rigid adherence to a set of unevolved specifications will, at some point, only produce dated products. Once effective specifications have been established, the challenge is creating a process for evaluating and integrating product improvements.

Often, it is advantageous for a fleet team to assemble a vehicle specifications committee to get input from all key stakeholders. In some organizations, this may constitute a robust group including, where applicable, management representatives from segments of the organization that use distinctly different vehicle designs, organized labor, work methods leaders, and safety specialists, along with fleet leaders. In many cases, supplier technical team members can and should be part of the mix.

It is generally advantageous to enlist informal leaders for your team membership. Often, they will ask the most challenging questions, but their coworkers pay careful attention to their guidance. Consequently, when your specifications team makes an endorsement, you can generally make fleet changes and evolutionary decisions more effectively.



FLEET
MANAGER

SUPPLIERS

VEHICLE
USER

EXTERNAL
SOURCE DATA

NTEA
TOOLS

SUPPORTING
REFERENCES

NTEA Tools & Resources

NTEA offers a variety of resources, guides and other benefits to members, including guidance specific to the vehicle specification process, such as:

Guiding Principles for Developing Commercial Vehicle Specifications

This introductory resource provides a foundational understanding of the commercial vehicle specification process — the what and the why behind creating effective, reliable specifications. Free access for members and nonmembers.

Vehicle Life Cycle Cost Tool

Designed for fleets, engineers and sales professionals, this flexible tool helps users evaluate total cost of ownership for single vehicles or entire fleets. Member login is required to access the application.

Vehicle Center of Gravity & Axle Weight Calculator

When upfitting or modifying a vehicle, use this web-based, interactive tool to calculate vehicle center of gravity position, axle weights and more. Member login is required for use.

Truck Equipment 101

Learn more about the work truck industry through this introductory course, including sections on truck basics, powertrains, regulatory requirements and more. Available to members for \$0 (login required) and nonmembers for \$199.

Truck Equipment 201

In this course series, build on existing knowledge and reinforce advanced technical concepts related to commercial vehicle systems, from powertrains to vehicle certification. Members receive access to all modules for \$0 (login required). Available to nonmembers for \$49 per module.

NTEA FMVSS Guide

Find key information related to Federal Motor Vehicle Safety Standards (FMVSS) applicable to various vehicle types and scenarios. Free access for members and nonmembers.

NTEA Chassis Manufacturer Directory

Use this directory to easily find chassis manufacturer sales information and technical contacts, including direct links to body builder resources. Member login is required to access technical resources.

Canada Regulatory Compliance Guide

This resource helps multi-stage manufacturers understand and comply with vehicle regulations in the Canadian market. Member login is required to access this resource.

Commercial Vehicle Certification Guide

Offers a representation of compliance mandates and implications facing work truck industry companies in North America. Available to members for \$189 and nonmembers for \$339.

U.S./Canada Mud Flap Requirements Guide

Explore mud flap and splash guard regulations for trucks, buses, and trailers across all 50 U.S. states, Washington, DC, and all 10 Canadian provinces and 3 territories. Member login is required for access.

About NTEA

Established in 1964, **NTEA** – The Work Truck Association, a 501(c)(6) organization, represents more than 2,100 companies that manufacture, distribute, install, sell and repair commercial vehicles, truck bodies, truck equipment, trailers and accessories. Buyers of work trucks and the major commercial truck chassis manufacturers also belong to NTEA. The Association provides in-depth technical information, education, and member programs and services, and produces **Work Truck Week®**, **Future Truck Summit**, **Commercial Vehicle Upfitting Summit**, and **Executive Leadership Summit**. The Association maintains its administrative headquarters in suburban Detroit and government relations offices in Washington, DC, and Ottawa, Ontario, Canada.



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