

Customizing with Confidence

Gems Design and Manufacturing Engineering Services

For nearly 60 years, thousands of OEM customers have placed their trust in the product quality and reliability of Gems Sensors & Controls. Throughout its rich technical history, the company has served as an invaluable provider of field-tested solutions to complex measurement challenges. Manufactured products include standard and custom liquid level, flow and pressure switches, miniature solenoid valves, and fluid systems for a variety of markets.



Engineering excellence is at the cornerstone of every Gems product. This is passed onto customers in the form of a well-designed, highly robust solution with extended service life. So, what happens when a larger-scale OEM application calls for something more “out of the box” than “off the shelf”? What if a custom solution from another manufacturer is already designed-in, yet not meeting expectations? What if the new custom solution is needed in a relatively short timeframe, and yet the legacy technology, or supplier, is now obsolete? Solutions to these problems for many qualified OEMs may be found in Gems custom engineering services.

Building partnerships reduces risks

For any OEM, a poorly selected customization partner is a costly, time-consuming venture. The losses can be realized in a variety of ways. Perhaps the partner might lack the necessary in-house resources for rapid response. This can create hidden costs and unforeseen delays. Or, perhaps a partner might demonstrate a lack of experience in the technology or application. This can mean unplanned design revisions and improper technology integration. Further complicating matters is the fact that once a component is designed-in, it can be very costly to design out. Particularly, when already produced at OEM volumes and specified into the bill of materials.

Gems understands that when it comes to helping OEMs mitigate their customization risks, there is no substitute for experience. The company prides itself on the proven reliability of its product portfolio, derived over many decades of success stories and thousands of applications.

A particularly remarkable talent of the Gems engineering team is their capability to effectively optimize legacy sensor design-ins. Particularly, where specific space constraints, connectors, and measurement ranges are pre-determined, yet where the need for significant technology upgrades within such fixed parameters remain.

In all cases, Gems combines proven engineering excellence with best practices in global design, lean manufacturing and procurement. This formula for success results in effective solutions to virtually any measurement challenge. As a result, each Gems product can be custom designed, manufactured and implemented at OEM volumes within shorter lead times than many other industry off-the-shelf options.



Building a lasting foundation

Qualified OEMs opting for Gems custom engineering services receive an immediate wealth of hands-on product design, development, systems integration and customization expertise. This includes a team well-versed in tightly integrated designs and complex legacy footprints. For the OEM customer, this means that all aspects of design, revisions, prototyping, manufacturing and testing, as well as complete support for the bill of materials (BOM), are managed by a single, cohesive, cross-functional team. This also includes strategic global component sourcing to increase reliability, streamline costs and reduce time-to-market. It can also include expanded sensor manufacturing efficiencies to include production in multiple countries, simultaneously, for improved logistics and lead times.

By working in partnership with Gems, a customer can expect full transparency and regular briefings. They can also expect to be well-educated on all available options and possibilities, for informed decision making. This type of customer-centered approach forms a vital cornerstone for future collaborative success.

Reducing costs with smart engineering

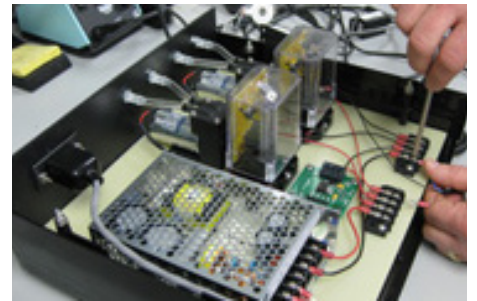
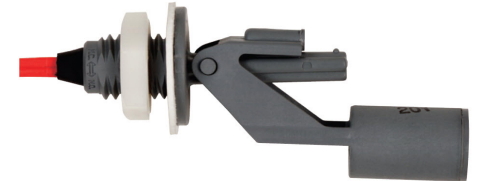
As part of its unwavering commitment to R&D and product quality, Gems actively invests in the continued education of its in-house engineering team. Ongoing company-wide training ensures that all Gems engineers are highly competent. The intensity of such training ensures that a custom collaboration will always include well-informed technical decision-making.

All Gems engineers are trained to work smart. If a sensor design can be streamlined or simplified, they will find a way to improve it. This same ingenuity inspires Gems to continuously evolve its standard catalog products to address a wider breadth of measurement challenges. It also leads to the identification of project time and cost savings.

Design engineering and rapid prototyping

An experienced engineer can spot potential application challenges right at the drawing stage. Such expertise can help to resolve inherent design flaws before the first prototype sensor is ever made. Gems engineers routinely work with customer-supplied or original drawings to verify dimensional data, tolerances, connectors and mounting configurations, as well as to ensure support for the overall BOM. Gems also incorporates the strategic sourcing of high-reliability components at the lowest possible price points. Failure Mode and Effect Analysis (FMEA) may also be employed to systematically evaluate new sensor design performance. These methods help to identify, minimize and prevent potential sensor failure modes prior to full-scale production.

Through a combination of effective product designs and rapid prototyping, accelerated sensor customization is achieved. Gems can typically manufacture test-ready samples of custom solutions within two weeks. The samples allow for in-application testing of custom sensor design form, fit and function vis-à-vis the rigors of its intended installation environment. It also allows for design refinements prior to full-scale OEM volume production. By making any necessary changes at the prototype stage, manufacturing costs and lead times are fully optimized.



Creating an integrated problem-solving environment

Gems has structured its internal operations as an integrated, multidisciplinary problem-solving team. This cohesive group is comprised of world experts in sensor design and development, spanning sales, engineering, global sourcing, production planning, testing and operations. From the very earliest point of consultation, the Gems engineering team is involved in the data collection and evaluation of OEM volume custom product manufacturing needs. Typical data points include application details, performance requirements, intended volumes and target cost points. Gems engineers also evaluate existing customer solutions for their overall performance and application suitability. Collected data helps customers to determine whether an alternative technology might improve performance or reduce costs.

Sourcing quality components

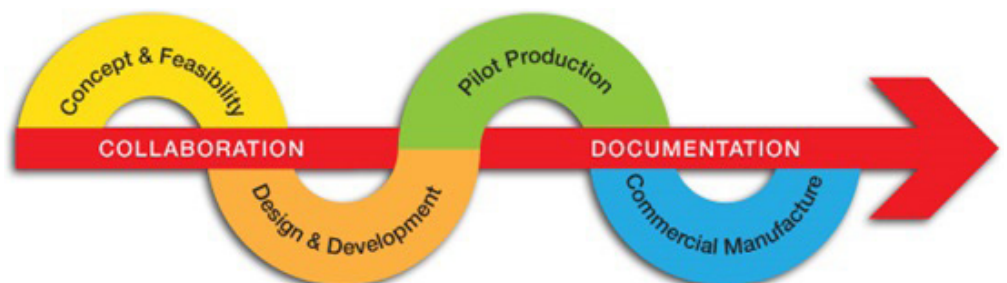
Gems strategic sourcing teams focus on the achievement of continuous quality improvements in component supplier reliability and quality. This includes the pre-screening of specified BOM components via design reviews, overall supplier performance evaluations, and routine supplier audits. To ensure the shortest possible lead times, Gems global sourcing personnel are involved at the very earliest stages of product design. They quickly identify the best suppliers, components and pricing, as well as ensure that required components are available for immediate OEM volume manufacturing upon receipt of customer design approval.

Streamlining product manufacturability

Gems engineers also work to continuously streamline the manufacturability of all products. Company-wide goals include improved yields, reduced inventory requirements, shortened production cycles and reduced costs. To help achieve this, dedicated manufacturing cells are established for each custom sensor project. These cells encompass all of the necessary production steps for proactive assessments and corrections of potential failure modes.

Lean manufacturing principles drive all global manufacturing operations. Gems maintains co-located ISO9001 certified manufacturing facilities in North America, Europe and Asia. Each has the necessary state-of-the-art equipment to simultaneously address all areas of design, sourcing, and manufacturing. For customers developing semiconductor, medical, or other sensing technologies with stringent quality and anti-contamination measures, Gems further maintains specially designated facilities. Each includes the necessary infrastructure to ensure strict and full compliance with global regulatory standards.

Final custom manufacturing of all Gems products can be routed via the facility most local to the customer. This reduces transportation and logistics costs, as well as lead times. Global manufacturing also allows Gems to provide complete assembly, labeling and packaging support for both small-and large-quantity OEM volumes. Consistent manufactured product quality is guaranteed, regardless of location.



Building efficiencies with dedicated equipment

For qualified OEM customers with larger-scale production needs, Gems can extend equipment sourcing benefits. This includes dedicated shared capital equipment and tooling machinery at any one of Gems global manufacturing sites. In providing this service, the customer can receive unprecedented access to state-of-the-art manufacturing resources across all of their layout strategies. By combining such critical tooling and manufacturing layouts, both Gems and the customer can optimize production. This shared access to critical production infrastructure increases mutual end product quality and consistency, while ensuring adherence to ongoing maintenance schedules.

Product testing and validation

Gems validates and tests all products to ensure that they meet or exceed published specifications. Depending upon intended market end use, Gems can also validate products to specific standards, such as SAE or MIL-spec. They can also conduct durability and fatigue testing over extended life cycles, in higher temperatures, or within higher humidity environments. By conducting such extensive testing in the same location as its design and manufacturing operations, Gems can proactively address any needed process revisions that might otherwise delay final OEM volume production.

Thinking longer term

When customizing sensors at OEM volumes, the choice of design and manufacturing partner can be as critical as the finished product itself. With this in mind, Gems tailors its custom engineering services to meet highly individualized customer needs.

The company understands that it is simply not enough for any custom sensor manufacturer to produce reliable, high-quality products. To be truly successful, it must be fully committed to rapid customer response, on-time delivery, and quality. It must offer all of the necessary resources, personnel and equipment for engineering innovation and quality manufacturing operations. Ideally, it must also offer flexible options for globalized manufacturing. At Gems, all of these elements combine to facilitate customization with confidence.



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