**Quality Inspection**

**Special Feature: Fastener Quality Inspection**

compiled by Fastener World Inc.

Most of us may have heard, “For good quality, prioritize manufacturing process over inspection.” However, we can’t achieve this without inspection if we want to ensure consistent product quality in actual applications. This is the very concept that gave birth to this feature.

First, we divide this feature into 3 major sections including production, inspection equipment, and last but not the least, verified testing labs and quality specialists. Obviously, we need to talk about products if we are to expound upon quality issues. Likewise, we have to look at suitable equipment as well as trusted labs and specialists before we discuss quality.

We are pleased to invite 4 Taiwanese inspection equipment suppliers to introduce their products and predict the market trend of quality inspection and 6 fastener manufacturers with top-class quality inspection systems to tell you how to maintain quality from the very beginning of manufacturing and how to set up verified labs to make sure that products are delivered to clients with perfect quality. In addition, 4 experts with decades of experience in fastener inspection and lab verification consultation will also detail on their inspection service and share opinions on the trend of Taiwanese fastener inspection. A roundup of 3 corporations from the U.S. and Luxembourg is also included at the end.

Don’t miss out on this coverage if you are to set up labs or purchase certified products with quality.

**Inspection Equipment Suppliers**

- Chun Chan Tech Co., Ltd.
- Fascon Corporation
- Keyence Taiwan Co., Ltd.
- Yang Yi Technology Co., Ltd.
- Fastener Suppliers with Labs
- Essence Method Refine Co., Ltd.
- Fastener Source Inc.
- Fong Prean Industrial Co., Ltd.
- Linkwell Industry Co., Ltd.
- Thread Industrial Co., Ltd.
- Taiwan Shan Yin International Co., Ltd.

**Laboratory**

- National Measurement Laboratory R.O.C.
- Metal Industries Research & Development Centre
- Q-Lab, INC.
- iTAC Laboratory Co., Ltd.

**Europe & USA company**

- Greenslade & Co.
- Magnetic Analysis Corporation (MAC)
- Vibrationmaster

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**Q1. Briefly introduce the features, advantages, and competence of your main inspection equipment.**

**KEYENCE**

1. **Main product:** IM-6600 series measurement system.
2. **Features:** It can measure 99 dimensions in 2 seconds. No need to re-focus and re-position. Easy to operate and measure by pushing a button. Exportable and customizable statistics file.
3. **This model performs semi-automatic measurement with more precision and the fastest measuring speed in the industry. It is less restricted to environmental factors such as temperatures, and a QA room to perform measurement with this machine is not necessary. In addition, this model is advantageous and competent with abilities to conduct first-piece measurement, in-process inspection, and pre-shipment inspection.
4. **After-sales:** Training sessions for equipment operation, software upgrade, and spare machines ready for use during maintenance.
YANG YI

We offer inspection equipment for testing tensile strength, torque, and related fasteners, including universal torque and material testing machines, compliant with ISO, EN, ASTM, IFI, and JIS. We can design machines and develop control circuits and software. Machines are mostly powered by servo motors, coupled with precision transmission units to stabilize operation. Control circuits are powered by FPGA and controlled by high-speed MCU, using different software as per equipment specification and the same control system to work in conjunction with various sets of inspection equipment. Specifications are adjustable as per client’s demand, and clients can add automated equipment to perform inspection in production lines. We manufacture the entire equipment as a whole and are the first company to offer 2-year warranty. We offer powerful after-sales service of technical consultation and free software upgrade to satisfy various clients’ demands.

CHUN CHAN

1) Our main products are glass optical and plate optical sorting machines.

2) Glass optical sorting machines are specifically applied to nuts, screws with larger head sizes, or other special parts; plate optical sorting machines are applied to fasteners that are suspensible.

3) Our products are exclusively for simplified structures, easy operation and a wide range of applications.

4) We decided to focus on nut sorting machines first in order to avoid rivalry at that time. After we rolled out a series of nut sorting machines, we expanded our service range and started producing screw sorting machines. We specialize in technology and dedicate ourselves to solving clients’ problems. Thus, with positive reputation and client recommendation, we have reached extremely high proportion of market share in the industry. Most nut companies in the industry use our glass plate optical sorting machines.

5) After-sales:

a. We offer training sessions where clients can learn how to operate and maintain the software and internalize this skill.

b. Our machines can be connected and controlled remotely. Every time when clients see problems, our staff can connect to clients’ machines and tell them how to solve problems.

Q2.

What is your opinion about the status quo and future development of the fastener inspection market? Do you have plans to develop new inspection equipment in the short term that improves your competitiveness?

CHUN CHAN

Current inspection techniques for general fasteners have been quite mature, so we started to develop inspection equipment for special products to service more clients. As clients encounter more and more problems, we continue R&D and upgrade inspection abilities of our sorting machines to satisfy needs of the industry.
FASCON

Fasteners are basic parts widely used in the manufacturing industry. The upgrade of fasteners is one of the most critical issues concerned by the industry. However, industrial upgrade can’t be just a slogan and had better be achieved with the aid of measuring tools. Several companies may have concentricity gages or even expensive products imported from abroad, but most of the time they are not used and are placed in labs only for a demo purpose, or in a better scenario, used by a few quality specialists. Ironically, operators in the forefront who actually need to gauge concentricity have no proper and economical gages for use. Up to now many companies still rely on their bare eyes or experience of veterans during inspection. In a modern process control system, it is more persuasive to use measuring tools to ensure reasonable concentricity of fasteners.

When visiting fastener plants in Europe or the U.S., we will always find not only common measuring tools (e.g., Caliper, Micrometer and Thread Ring Gage), but also concentricity gages usually used in testing labs. The reason is that inspection using concentricity gages is a routine task of operators in these plants. If the concentricity of products is accurately positioned, not only the dimensions of products will be more stable but also the lifecycles of molds & dies can be effectively increased. Particularly when changing molds and dies in multi-stroke machines, the use of concentricity gages can reduce manmade errors or tolerances caused by eye inspection, as well as shorten time for replacing molds and dies.

In early times, concentricity gages were often used to inspect eccentricity of fastener heads. With the advancement of technology, fasteners become more sophisticated in forms. Some companies may not be familiar with definitions of various international geometric tolerances until they are aware of the demand but find the purchased instrument is unable to complete the required task.

KEYENCE

The fastener industry mostly uses traditional 2D and 2.5D image measurement systems for quality control. Keyence’s IM-6600 series measurement systems can reduce labor cost to reach maximum efficiency. Keyence offers numerous options in inspection equipment, which have been widely adopted in the world. We offer the most effective solutions based on actual demand and roll out new products every year according to changes in the market. We will continue to develop inspection equipment to bring the best solutions to our clients.

Apart from IM-6600, the VR-3000 series 3D microscope can scan surfaces, replacing the traditional contact profile measurement system. Inspection can be instantaneously completed within 4 seconds at the fastest.

YANG YI

So far, construction, automotive and aerospace fasteners still cannot be replaced with other low-cost but high-strength products. Thus, in order to ensure safety of fasteners, the demand for strength inspection has been growing in recent years, especially the demand for torque measurement systems. As fasteners with low quality can no longer satisfy users’ demand, companies have to improve the manufacturing ability, enhance quality control, and produce low-cost but high-quality fasteners through upgraded R&D by inspection equipment. It is still promising for the industry of fastener inspection. Therefore, we continuously improve the performance of our torque inspection equipment, reduce prices, and develop rapid image and automated systems to satisfy the demand for fastener inspection. With our specialized knowledge, we can help clients improve the inspection ability, solve problems and reach mutual victory.

Q3. As Taiwanese fastener industry stresses more on high quality, what type of equipment will grow in sales? What do you think is the future for inspection equipment?

CHUN CHAN

(1) Taiwan is a fastener exporter with products trusted by many countries. Many companies in Taiwan have introduced sorting machines and such demand will become saturated. Currently more and more industrial and emerging countries, like India and China, are interested in sorting machines. In addition, Southeast Asia, Europe, and the U.S. are also critical markets for our business.

(2) As Taiwanese fastener industry emphasizes on quality so much, more and more factories will start to consider introducing sorting machines. Current clients will place more inquiries to us because they feel their products have improved in quality. Increased capacity will bring up more demand for sorting machines, so service in Taiwanese market is critical.

As Taiwanese fastener industry stresses more on high quality, what type of equipment will grow in sales? What do you think is the future for inspection equipment?

KEYENCE

Our inspection machines will still be mainly for fasteners and CNC parts, as well as plastic injection, powder metallurgy, stamping parts, and forging.

YANG YI

The high quality of Taiwanese fasteners is mostly dependent upon the stability of geometric accuracy, strength, torque, and locking force. In order to meet these requirements, it is necessary to improve and control all manufacturing processes with the aid of proper inspection equipment to satisfy clients with good quality. Regarding fastener quality and safety assurance, most companies stress more on testing hardness, tensile strength and load, rather than torque and locking force. This could result from a couple of reasons: difficult theoretical knowledge, plenty of complicated testing variants, and costly machines. As China has become the largest fastener manufacturing country, the market in the future will be of course in China. If Taiwanese inspection equipment makers can develop and improve domestic inspection technology, they will be able to lower prices and greatly increase the quality of the industry. Accordingly, we continue to develop new inspection equipment and hope our strength and torque related inspection machines can continue to outpace China in the long run.
Fastener Suppliers with Labs

**Q1. Talk about your quality inspection lab and the integral arrangement of facilities.**

**Essence Method**

We are specialized in non-standard automotive/motorbike products and are dedicated to the R&D of precision and special parts. We have our own surface treatment plant for the production of construction fasteners.

In addition to ISO 9001 and CE, recently we have been certified by ISO 17025 of TAF, covering all fastener inspection. In the future we expect to be certified by TS 16949, which will help create a more complete and accurate quality management system. 7 staff work for the quality inspection department with over NTD10 million worth of computerized facilities that achieve fast storage efficiency.

**Fong Prean**

Established in 1986, Fong Prean considers quality to be the most important part of the company. So far it has been certified by ISO 17025, ISO 9001, ISO 14001, TS 16949, CE 14566, CE 14592, etc. Manager Lee in QA department said, “70% of Fong Prean’s products are exported to USA. Currently 3 U.S. purchasers contacted us and requested for ICC certification and we are already planning to apply for it.”

The QA laboratory of Fong Prean is undertaken by a team of 8 people. They are responsible for the fulfillment of works required by certifications, product testing, staff trainings, and relevant documentation. Every year it spends at least NTD 200 thousand procuring testing facilities and the budget can be flexibly adjusted according to actual demands. It has X-Ray thickness tester, 10-tons tensile testing machine, 3D projector, micro-hardness tester, worth over NTD 10 million in total.

In terms of quality control, these 8 people are asked to take different responsibilities in 3 main sectors including semi-finished product, heat treatment, and surface treatment for ensuring the quality of products. The turnover of QA staff is quite low, and even the least senior staff has 6 years of practical experience in testing.

Fong Prean realizes its insistence on quality through having “perfect and practical testing equipment and well-experienced QA staff.”

**Fastener Source**

In order to upgrade our competitiveness, Fastener Source began to plan the organization of a testing lab of TAF (formerly CNLA) in 2005 and hired professional instructors to guide the quality assurance staff and relevant management staff to set up, execute, and operate the testing lab. We invested NTD 2 million in the setup, facility procurement, and staff trainings and hired 3 quality management staff to maintain the operation for quality control. In mid-2006, we were certified by TAF, proving that Fastener Source can have the inspection done compliant with ISO 17025.

**Thread Industrial**


Scale of our lab:

The current quality assurance department has 30 staff (15 are for testing and main tasks are quality control in each station and testing acceptability of products from other partnered companies). Testing equipment includes: 2 projectors, 1 universal testing machine (100 tons), 2 thickness testing machines, 4 hardness testing machines, 2 tapping speed machines, 2 salt spray machines, 1 metallography observing machine, etc. The inspectors use representative testing forms to carry out inspection and ensure the quality is compliant with customers’ requests.

The sorting department has 15 staff in a team, mainly for satisfying special requests of customers. Products are sorted manually and automatically with full operation of all machines (Currently there are 5 machines and more will be introduced to replace the direct watching with eyes for reducing ignorance and labor costs).

Before the company diversified its product range and most of its products were standard parts, there were only 8 quality inspectors and the scale of testing equipment was half the current scale. In order to increase competitiveness, it continues to adjust the arrangement of quality assurance staff to satisfy customers’ demands.
Linkwell

We founded Kangwell Industry Co., Ltd. in 2003 for all testing demands from Linkwell. It has been 10 years since Kangwell gained the certificate of TAF in 2004. Staff are all well-trained to execute standard testing procedures in the laboratory. In order to satisfy customers’ demands for product testing, testing equipment for dimensions, properties, coating thickness, salt spray, and microscopic observation of metal have been perfectly set up for instantaneously getting correct testing results and offering customers all-in-one testing reports. With the continuous upgrade of products, Linkwell always takes the lead in the industry and its products have been certified by CE EN14566 and CE EN14592, which is why Linkwell is trusted by clients.

Taiwan Shan Yin

Founded in 1984, TSY is a multinational corporation with 5 plants abroad. With over 31 years of experience in patented fasteners, automotive/motorbike components, and general fasteners, it has successfully stepped into the manufacture of dental implants and other medical parts. Insisting on providing the best quality, reasonable prices, on-time delivery, and quick after-sale service, it has been widely trusted by customers in over 30 countries.

Products are what make a company survive while quality is what a company can take pride in. TSY focuses on quality management of products. On the basis of CNLA certification procedures, it keeps improving and upgrading. In order to ensure the accuracy of quality, it introduced various advanced testing equipment like optical projectors, metallographic microscope, hardness tester, thickness tester, tensile strength tester, and salt spray machine. From raw materials to delivery of products, professional quality inspectors will strictly control and track every process to offer customers products with high quality and stability, fulfilling the target of satisfying customers.

The QA department has been certified by TS16949 and TAF and is in the capable hands of 8 staff (4 for IPQC and 4 for FQC). IPQC is responsible for examination in production lines while FQC is responsible for inspection of products before they are in stock. Certificates of TS16949 and other labs are valid for 3 years. During the 3 years, an audit from the outside will be carried out each year and the extension of certification will be reviewed after 3 years. As a result, the validity of a certificate is the best proof for a company.

Q2.

What is your major market? How do you prove to global buyers that your quality control system is compliant with international standards (e.g. credibility and accuracy)? After gaining certifications, do you see any concrete increase and improvement in your sales worldwide?

Essence Method

Our major markets are Europe and USA. Our quality inspection system is calibrated by TAF calibration laboratory and ITRI and the certification can be traced back to the highest standard of the laboratory. More and more sets of testing equipment have been introduced. Using scientific data to persuade customers, they will have further confidence in the quality inspection system of suppliers.

Fong Prean

Our main markets are 70% in USA, 10% in Europe & Japan, and 10% in other regions. The lab of Fong Prean has been certified by NVLAP for over a decade. The most direct but invisible benefit comes from customers’ trust in Fong Prean. Although every year it has to spend over NTD 1 million on certification and extension of validity, the trust between each other actually shortens the time of sales to deal with inquiries.

Taiwan Shan Yin

Our wide range of products makes us establish successful distribution networks worldwide. With complete order and shipment procedures, we can provide customers with faster and more complete service. Our sales are 45% to USA, 35% to Europe, 10% to Australia, and 10% to Asia. In recent years, we have changed our focus to products with higher technical levels and added values. Over 80% of our products sold are patented parts. We insist on providing the best products, reasonable prices, punctual delivery, and fast after-sale service and have won customers’ trust and confidence from over 30 countries as well as the award for superior and innovative suppliers from a customer.
Thread Industrial

Our major markets are in Europe and USA (over 60% of the total share) and we keep diversifying our markets. About 40% of our products are customized nuts for car manufacturers.

We used to talk of current quality certifications in advertisements and regularly visit potential customers to let them know our stress on quality. In the company, we think precision testing tools are a must-have to supervise manufacture of high quality products, so all equipment is periodically tested, calibrated, and replaced to ensure the best performance are compliant with international standards, which is part of the QC measures implemented in the plant to give customers a sense of “aesthetics & fair price”.

We are active in joining in works of international quality certifications and improving our abilities, which guarantees our product quality offered to customers. Before customers place their orders, one question often asked for later appraisal is “have you got any quality certification?” which will strengthen our advantage.

Fastener Source

Over 70% of our markets are of automotive fasteners. Since we are an export trader, we cannot apply for the certificate of TS 16949 most car manufacturers require, so, we set up a testing lab certified by ISO 17025 to carry out all testing activities. The credibility and accuracy of all equipment are all tested and proved by verified calibration labs with relevant reports. In addition, it is audited by TAF every year and can pass the audit at all times. After gaining certifications, the increased customers’ loyalty and support pushed the total sale up by 10% and growth in new customers by 15%.

Q3.

Talk about how you realize and carry out quality assurance in your quality inspection, manufacture, and partnership with other companies.

Fastener Source

In order to control the quality, not only quality inspectors are required to examine products directly at associated companies during production, but also associated companies are required to ensure every testing activity is compliant with SIP from checking on delivery to shipment after sorting and packaging.

In addition to monthly training, quality inspectors are also asked to irregularly attend external training programs given by Q-LAB, MIRDC, and TAF. Through these trainings, quality inspectors can further understand regulations and ways of quality control, reducing chances of making faults to the lowest.

Taiwan Shan Yin

The quality assurance system of TSY has been computerized. When IPQC inspectors enter batch numbers into the system, the computer will show names of screws, where to inspect, and special requests from customers. After that, inspectors can carry out inspection. Data resulted from inspection will be uploaded to the computer and cannot be modified. Whatever the result is, the system will send an email to notify the management. Should there be no record of inspection within a certain period of time, the system will also send an email to notify the management. As every step is closely related to each other, once there is something wrong, the management will be notified soon.

When a process control staff is looking for suppliers, the quality assurance department will also be asked to join in the evaluation of suppliers together, which will also keep companies informed of our or customers’ special requests, sampling, and acceptable quality level. Every quarter the Suppliers Committee will be given and each group will report “abnormal” suppliers. After that, we will provide them with guidance helping them reach the quality we require.

We have SOP for staff training. New employees have to pass the audit before they can go into production lines for the task of inspection while existing employees will be sent by their directors to receive related training every year, in order to improve and strengthen their knowledge and techniques. Directors in the quality assurance department have to check if the standards of each country have been updated or not and let every employee know the latest international regulations and standards.
How do you set the short/mid/long term goal of your quality inspection?

**Fong Prean**

We routinely carry out quality control in manufacturing process, which means all workers on site have to consider quality control a part of the manufacturing process, from operators’ self-check every two hours to random examination of the director in every station. As quality is supervised during the manufacturing process, not only the efficiency of quality assurance department can be largely increased, but also the quality of Fong Prean can be concretely demonstrated.

About 100 associated companies are in cooperation with us. They are selected by the quality assurance and process control departments based on their lead times and quality. For those associated companies with excellent performance, more orders will be placed as an encouragement. It also helps associated companies upgrade their abilities or even cuts off cooperation to ensure our stress on quality.

It has SOP manuals for every equipment and item, used as criteria of quality inspection.

**Linkwell**

We have factories in China, Thailand, Malaysia, and Indonesia and products manufactured in our plants are all compliant with ISO/IEC17025. Other products manufactured by associated plants will be carefully monitored by inspectors based on standards and regulations. Our quality inspectors are trained to test quality of products independently, impartially, and objectively. The testing standards of products are all systematically managed, creating a complete unity in the standards for consecutive procurement of customers.

**Thread Industrial**

Our onsite staff have proper testing equipment (e.g. thread gages, projectors,...) to regularly examine and calibrate movements to ensure accuracy. Currently products manufactured in plants have to be inspected with multiple cross examinations [incl. first-piece check, inspection of operators and quality inspectors, batch shift] station by station. Quality has to be confirmed in every station before products can be moved to the next step. It uses the SFT control system to monitor the process in each barrel. If the previous manufacturing process is not complete, the following one cannot be started. It employs quality management methods to control important specifications of products as well as utilizes SPC beside machines, achieving effective control in every step and ensuring products shipped to customers are compliant with regulations and satisfying to their demands.

In selecting associated companies, what we will do first is to preliminarily evaluate quality and lead times of suppliers; then, before an order is placed, the double check of samples, drawings, and testing methods will be carried out. If products delivered from associated companies are not compliant with standards, we will discuss measures for improvement and add them into the annual audit of suppliers next time.

We pay much attention to staff training. In addition to subscription of related publications for employees to read and understand the industry, we also have annual plans to send our staff abroad for training. We also attend seminars for understanding the latest activities and standards, and focus on the attitude and techniques of communication between quality inspectors and onsite staff.

**Essence Method**

Our short-term goal is to reduce the monthly defect rate; the mid-term goal is to realize 0 ppm in quality; the long-term goal is to achieve total quality management, which means every one can do quality inspection.

**Fastener Source**

We focus on reinforcing staff training in the short term, making them familiar with every standard and know what it means. On the other side, we keep guiding and monitoring the quality policies of associated companies. Our goal in the long term is to broaden our testing capabilities in the lab as well as introduce more testing equipment to satisfy customers’ demand.

**Q4.**
**Linkwell**

We pay much attention to the cultivation of QA staff specialties. Every week we discuss abnormal conditions found in inspection and every 2 months we give training programs inviting lecturers outside the company to conduct classes or send our staff to attend classes. The goal is to complete inspection that is more practical with the evolution of products and updates of regulations.

In the production of diversified products, staff are also properly trained to understand how products are produced, so that they can learn more about production from inspection. The long-term goal is to satisfy customers with the best quality resulted from the most complete inspection and help associated companies improve to meet customers’ demand.

**Taiwan Shan Yin**

The goal is to train all QA staff to be quality engineers, who can not only do simple testing works, but are also capable of analyzing causes of abnormal situations and giving feedback to the onsite operation, making it improve continuously to achieve the quality of 0 ppm required by the company.

**Thread Industrial**

1. Short term-
   
   [1] Reinforce the specialties of staff, and increase their capabilities and multi-function support.
   
   [2] Quick replacement of testing equipment to make sure they are all best suited to complete tasks at all times.

2. Mid term-

   [1] Use automatic testing equipment to avoid manmade errors, thus increasing efficacy.
   
   [2] Make sure everyone in the plant knows the importance of quality. Take care of the process like your customers and do not allow any defective product. The current quality level of products must always be reported to all staff in the company.

3. Long term- Reduce the defect rate to achieve an obvious increase in cost-effectiveness and revenue.

**Experts of Fastener Inspection Service**

**Challenges for Fastener Inspection Industry**

Tzeng-Yow Lin, NML Deputy Director

The mission of Taiwan’s National Measurement Laboratory (NML) is to provide the industry with referential measurement standards and ensure the consistency with the international measurement standards. NML offers measurement calibration service for fastener inspection instruments. So far the industry adopts CNS marking (voluntary product certification) or international standards like ISO TS16949 (certified by Taiwan Accreditation Foundation, TAF) for certifying fastener quality management. All inspection instruments or equipment involved must comply with the requirements of ISO/IEC 17025.

In terms of the export volume, Taiwan is only second to China. Taiwanese fastener industry used to focus on large volume and low-price fasteners, but now with this strategy it is hard to compete with China. Quite the contrary, Taiwanese fastener industry should go for high unit prices, large volumes, and fasteners with stringent quality requirements. Therefore, the automotive industry becomes the focus for fastener companies.

On June 23 of 1999, U.S. Fastener Quality Act (FQA) that intensifies control on fastener quality and prevents the use of defective products came into force. In order to expand business in the automotive market, many companies applied for TS16949 and ISO 17025 accreditation and hoped to be qualified automotive fastener suppliers. ISO/TS 16949 is a technical standard integrating existing automotive quality systems worldwide. It regulates and has various requirements for inspection. It is based on quality management and looks into quality management process to ensure that all complies with inspection requirements.

In order to upgrade fasteners to come with high added values, the industry has to acquire quality accreditations like ISO TS16949 (for automotive fasteners) or AS9100 (for aerospace quality management). In terms of processing and machining techniques, the bottleneck is in the techniques on molds, forming, heat treatment, and surface treatment. The upgrade of these techniques requires inspection technology like precision measurement for mold processing. This requires a high precision mold inspecting ability before a company can validate the size of a mold. The fastener inspection market includes the inspection abilities of fastener makers and labs that offer inspection service. The labs have to acquire TS16949 and AS9100 accreditations, combining both inspection service and quality management. The most important part is the calibration for inspection instruments because results of calibration reveal the measuring abilities of the instruments. With the best measuring ability, a company can ensure the authenticity of its quality management.
MIRDC for Inspection Service

Trusted Reports to Enhance Export of Taiwanese Products

MIRDC’s fastener inspection can be a great help for Taiwanese companies to export products to Europe (requiring CE), the U.S. (requiring AFTM), and Japan (requiring JIS). As for domestic sales, companies have to comply with CNS standards. These standards are quite similar, except that CE standards further require the inspection for toxic substances (e.g. lead, cadmium, and mercury).

Our inspection quality is not much different from those of other inspection institutes, in that we all have to comply with the same international standards. The lab itself has to pass the ISO17025 accreditation to guarantee the credibility of its reports. In terms of competitiveness, we have acquired ISO17025 and other international certificates like A2LA and NADCAP (the accreditation for aerospace fasteners). In addition, we also offer damage analyses for industries, including rupture of products or damage of molds due to unknown reasons. We use damage analyses to locate and determine reasons for rupture or damage as well as help the industry make improvements or take precautions.

A Trio of Trends for High Added Value- High-end Industries, Emerging Markets, Light Materials

Fastener inspection is a supportive service. Our service range does not only include fasteners but also include waterware, automotive & motor parts, LED, valves, medical device, and so on. MIRDC’s lab operates independently and offers service to many industries in Taiwan.

The total value of the global fastener market reaches nearly USD68 billion. In 2013 Taiwan exported around USD4 billion worth of fasteners with the average unit price at USD3/kg (I think the industry can still work harder to achieve higher added value). Take Japanese fastener export for instance, its average price landed at USD10/kg while Switzerland had the average unit price near USD16/kg, indicating there is still a long way to go for Taiwanese companies to seek higher values. The future fastener market will trend towards the following aspects: (1) The rising demand of the aerospace industry and the recovery of the automotive industry as well as the popularization of wind power boost the demand for related fasteners; (2) The emergence of countries with investments in infrastructure boosts the demand for fasteners; (3) The focus on lightweight becomes popular; (4) Light composite materials or titanium/aluminum/magnesium alloys will become the next-generation materials for fasteners with high added values. Accordingly, corresponding fastener inspection and forming technology will be the issues for industry upgrade in the future.

Feasibility of Industrial Alliances

More and more Taiwanese fastener companies have transformed and upgraded with success, and some of them tapped into aerospace, medical equipment, alternative energy, automotive, and railway industries. Their products have higher uniqueness and level. In order to meet clients’ requirements, product inspection at the back stage has to be upgraded to a certain level, too, in ways like increasing precision of inspection equipment and more development in micro-analytical technology for new materials.

A Commercial Fastener Inspection Lab in Taiwan

Q-Lab Inc. by Justing Cheng

Q-Lab Inc. was established since 1996. The purpose of Q-Lab is to provide a 3rd party commercial testing service to customers with professional, fair, actual, and independent service which conforms to related internal standards. As the only commercial fastener testing laboratory in Taiwan, Q-Lab received the ISO Guide 25 accreditation from A2LA in 1997. Followed by supersede standard, ISO/IEC 17025, in 1999 till now, Q-Lab was accredited by A2LA at Tainan Taiwan with Testing Laboratory # 0871-01 and Calibration Laboratory # 0871-02, and Suzhou China Testing Laboratory # 0987-03 to meet global customers’ requirements. Currently customers of Q-Lab span across North America, South America, Europe, and Asia. The average number of customer is over 100 monthly. The reputation and credibility increased by Q-Lab had been approved by global customers. Especially the domestic customers will apply for our testing when they have any conflict with their customers. Q-Lab provides customer with not only testing reports but also technical consultancy, and demonstration testing with customers’ suppliers. All the services Q-Lab provides result in customers’ high confidence level.

The core competition of a testing laboratory is in personnel especially the professional knowledge and experience. If any organization owns the testing equipment and no one knows the test methods, the issued test report will not be trusted. Currently there are 22 employees available in Taiwan. Their average working experience in fasteners is over 10 years, and the highest one is 34 years now. Among these staff,
6 people received CQT (Certified Quality Technician), 3 people obtained CQE (Certified Quality Engineers), and 1 got CQM (Certified Quality Manager) certificates. Also there are 2 TAF (Taiwan Accreditation Foundation) assessors and 1 A2LA (American Association for Laboratory Accreditation) assessor in Q-Lab. Although there are some testing laboratories in Taiwan, no one can compare with Q-Lab in human resource and professional knowledge.

Fastener testing laboratory is a solo market in Taiwan. Although there are lots of accredited testing laboratories, most of them only provide the testing service to internal customers but not to external ones. Also fastener testing will accompany the whole fastener industry without sole existing. Fastener testing market will exist in fastener manufacture, purchasing, and the end user. That is, where the fastener was manufactured, purchased, and assembled, there should be a need for the fasteners to be tested. Normally, the inspection level will be increasing or decreasing depending on the fastener’s characteristics. The higher requirements of the fasteners, the more complex the inspection parameters will be. For example, some cheap and non-critical fasteners have moved from Taiwan to Southeast Asia or China recently. Such fasteners will never be inspected for no matter what reasons. Currently Taiwan fasteners-related industries has a trend of moving forward to the fasteners used in the automobile industry. Generally the automobile industries will refer to international standards and create the test methods of their own. Such test methods are very similar to the international standards but not exactly the same. Testing laboratory should be capable of understanding the international standards and applying to the test methods of the automobile industries. Therefore, basic fastener knowledge appears tremendously important in this field.

Because testing service is always close to the end process of the fasteners procedures, compressing the testing time to prepare for the shipment is the normal situation. Q-Lab launches on-line tracking system for all customer to check their current testing status via q-lab website, anytime anywhere. Once the test is completed, customer can reveal the test results in this system. This system efficiently reduces the report typing and communication times. According to the 2013 Q-Lab statistic report, 98.66% of the test report could be completed in 20 working hours after receiving the samples from customers. That is 4 hours reduced compared to the previous 24 working hours. Q-Lab is dedicated in continuously improving and growing with customers by following the quality policy of zero defect, providing global fasteners industrial with the best testing service.

iTAC Lab with Human-Based Service

by Charles Chang, Managing Director of iTAC Lab

iTAC Lab, was founded in May 2005 and earned its TAF certificate (equivalent to A2LA) in April 2006.

Not only can iTAC’s testing laboratory provide accredited third party lab inspection reports, but it can also provide many other quality related service.

iTAC Lab service programs include:

- Third party testing and inspection
- Factory audit, CQI-9 & CQI-11 audit
- PPAP documentation consulting
- Laboratory outsourcing and subcontracting
- Customized testing solution
- Support to all aspects of quality related documentation and services.

iTAC Lab has professional knowledge and abilities to assist our clients in the fastener industry. In addition to general detection capabilities, we also provide the necessary assistance in analyzing test results with our recommendations, as many factories are not familiar with product requirements on a certain print/drawing or the international standards and specs, helping our clients improve their production processes and reduce manufacturing costs. Our ultimate mission is to make iTAC Lab a useful backup for our clients in quality, so that they can focus on product development and the fastener industry can continue to flourish in the long run.

The future challenge in the Lab/Testing industry is very competitive. A good laboratory is not to purchase advanced detection equipment only, but offer the strength of their service. It means a lot more to customers in maintaining professional service and communication as well as meeting their demand. This is the way for the Lab/Testing industry to go forward for a booming business.
Greenslade supplies the widest range of fastener inspection equipment in the world. Our line includes GO/NOGO and variable thread gages, recess measuring devices, head height protrusion gages, length gages, concentricity gages, tapping screw testing equipment (including drill-screw and torque-tension measuring), and recording equipment. Much of our unique equipment is covered by U.S. Patents.

Greenslade is a specialized provider of dimensional calibration services to manufacturers and distributors throughout the world. Our services extend to the automotive, commercial, aerospace, and medical industries. Our calibration laboratory has state-of-the-art precision equipment. To ensure the greatest degree of accuracy, all certifications are generated using automated input methods and a registered calibration software program. We are accredited to ISO 17025 by the American Association of Laboratory Accreditation (A2LA).

Greenslade designs special gages to meet customers’ unique requirements at NO CHARGE. Most design proposals are provided within 48 hours of receiving a design request. Gage designs can be of attribute or variable type. Greenslade also provides consultation services in matters related to fastener quality issues, gage usage, calibration issues and special gage design.

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MAC has been designing and manufacturing NDT (non-destructive) test instruments and systems for the metals industry for over 85 years. Our in-depth knowledge of NDT applications using eddy current, ultrasonic, and flux leakage technologies provides customers with reliable solutions for their testing needs.

MAC’s Comparator equipments, including the eddy current Varimac® VI and the electromagnetic low frequency Production Comparator, offer reliable, quick ways to test and sort large quantities of metal parts for hardness, alloy, dimensions, and some physical characteristics. After setup, Varimac runs automatically. For example, the Varimac VI is currently inspecting critical parts such as automobile engine rocker...
arm pins used in the drive train assembly for proper heat treatment and hardness. This instrument can also readily sort pins based on length. The latest model Varimac VI features a new monitor screen design that lets customers view peak signals for a batch of parts on the screen and then select and position target regions that correspond to the clusters they want to capture and categorize. Threshold levels within the target regions can be selected and adjusted to accept or reject pieces. MAC can also supply a high speed parts gate to operate with the Varimac to sort the parts at speeds up to 6 parts per second.

MAC already supplies comparators and other equipment to these markets in Asia, and would like to expand our business there.

Luxembourg

Vibrationmaster

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Vibrationmaster designs and manufactures advanced fastener testing technology and delivers specialized vibration test services. Our products include Junker Vibration Test machines to analyze and demonstrate the self-loosening behaviour of fasteners and bolted joints to DIN 65151 and the new DIN 25201. With a head office and R&D function in Luxembourg and advanced manufacturing facilities in Germany and India, we operate globally. Our customers span the commercial, academic, research, public, government and not-for-profit sectors. We offer highly reliable test solutions to organizations seeking innovative, market-proven and cost-effective technology to test and prove the reliability, consistency and safety of their products.

Our Junker Test Benches conform to the latest standards for transverse vibration testing of fasteners and bolted joints. They are currently available in five sizes, depending on the type and size of fastener you wish to test, and on whether the bench is for demonstration purposes or laboratory testing.