Relationship with Customers

Tamron is committed to contributing to society by supplying customers with safe, unique and quality products and services, putting the highest priority on satisfying customers, dealers and OEM customers.

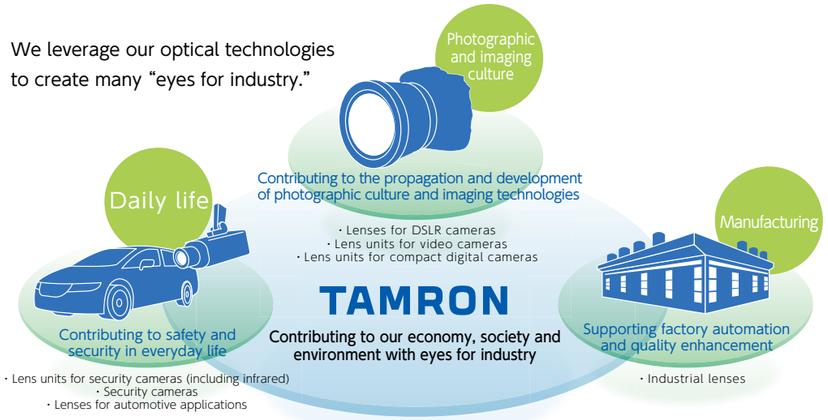
Summary of Activities in FY2017

- Created unique products that customers appreciate
- Mass production of recycled materials

Tasks for FY2018

- Create unique products and new challenges
- Promote environmentally conscious design

Tamron Products Familiar to All



Developing Unique Photographic Lenses

The SP 70-200mm F/2.8 Di VC USD G2 (Model A025) released in February 2017 is a large aperture telephoto zoom lens compatible with 35 mm full-frame digital SLR cameras. In addition to improved optical performance, the lens boasts higher AF speed and accuracy, enhanced vibration compensation (VC) [1] and a shorter minimum focusing distance. The lens employs an eBAND coating[2], fluorine coating[3] and a dust and drip-resistant construction, and also provides support for teleconverters[4], marking a significant advance across all the necessary performance metrics for a large-aperture telephoto zoom lens.

SP 70-200mm F/2.8 Di VC USD G2 (Model A025)

Appraisals of Tamron’s Products

The 18-400mm F/3.5-6.3 Di II VC HLD (Model B028) is a revolutionary lens as the world’s first[5] APS-C lens with a focal range of 18-400mm, offering a zoom factor of 22.2. Equipped with vibration compensation (VC) [1], sharp images can be captured even under low-light conditions such as sunsets. The Model B028 is also designed with a splash-resistant sealing making it well suited to outdoor shooting. The SP 150-600mm F/5-6.3 Di VC USD G2 (Model A022) is a next-generation lens with advancements in various features over the predecessor A011 model, including AF speed and accuracy, and a vibration compensation (VC) [1] mechanism. In recognition of their performance, these two models have won prestigious EISA Awards in Europe[6].

18-400mm F/3.5-6.3 Di II VC HLD (Model B028)

Category	Model	Award	Awarding Organization
Imaging (Photographic lens)	Model B028	EISA PHOTO INNOVATION 2017-2018	European Imaging and Sound Association (Europe)
	Model A022	EISA DSLR ZOOM LENS 2017-2018	

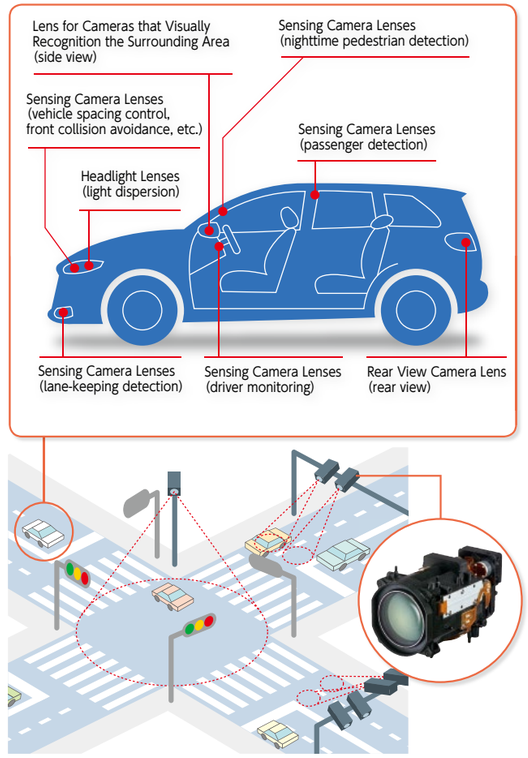
1. VC stands for Vibration Compensation, which helps prevent blurry images. Tamron lenses for Sony cameras do not offer Tamron’s VC mechanism because Sony includes an imagine stabilizing mechanism in the body of its DSLR cameras.
2. The acronym eBAND coating standard for Extended Bandwidth & Angular-Dependency Coating, which is a proprietarily developed membrane that makes images clearer and more complete. It uses a nanotechnology-based coating technique to form a multicoated surface with a super-low refractive index membrane to significantly reduce unwanted reflections compared to multicoated surfaces made from resins.
3. The fluorine coating is a coating with excellent water and oil-repelling properties applied to the front surface of the lens element. The coating makes the lens surface easier to wipe clean and offers excellent durability.
4. A teleconverter is an accessory mounted between the camera and lens to expand the focal length of the lens.
5. World’s first among exchangeable lenses for DSLR cameras per a Tamron study in May 2017.
6. Tamron lenses have received an EISA award for twelve consecutive years since 2006. EISA is an acronym for European Imaging and Sound Association. This organization sponsors the EISA Awards along with editors and senior engineers from related media including photography, video, sound, and mobile electronics. Every year the awards recognize leading products in the fields of photography and audio visual media.

Lenses Underpinning Safety and new challenges

Lenses for Automobiles

To contribute to the safety and security of society, Tamron has focused on the developed of lens units(including infrared units) for surveillance cameras installed inside and outside buildings, as well as lenses for automobiles. Cameras and lenses have become essential features of cars. Tamron is engaged in the development of car-mounted lenses that are broadly categorized under two fields, lenses for cameras used for visual confirmation, such as rear-view cameras, and sensing cameras used for lane-keeping and autonomous driving systems. As regards traffic monitoring lenses, Tamron has developed a zoom lens that can be equipped with autofocus and remote operation capabilities, making it possible to flexibly monitor different types of road at different distances, and which incorporates image processing technologies so that users can extract the information they need for specific applications.
The Japanese government has set the goal of commercializing autonomous driving by the year 2020. In May 2017, the government unveiled a roadmap to the introduction of autonomous driving, kicking off a nationwide effort to promote the widespread adoption of autonomous driving technologies. In 2018, the Kids and Transportation Safety Act[1] went into effect in the United States, requiring the installation of rear view cameras and underpinning the growing awareness of automobile safety in Japan and overseas. In this way, there have been increasing demands for lenses tailored to this car-driving society, and Tamron will actively pursue development in this field.

1. Kids and Transportation Act. This law requires that all new cars come equipped with a rear-view monitor.



Monitoring and Security Camera Lenses

By the year 2020, roughly 90% of the security market is expected to have transitioned from analog cameras to networked cameras. The majority of these cameras are believed to be fitted with image sensors that capture images up to two megapixels or three megapixels in size. To meet these market needs, Tamron has developed a zoom lenses(Model DF033) with 40x magnification for combination with 3-megapixel cameras. By moving multiple zoom groups and focus groups, the size of the lenses can be reduced while maintaining the high magnification. Moreover, the ability to move multiple zoom groups enables even higher resolution across the entire zoom range, from visible light to near-infrared.

a zoom lenses with 40x magnification (Model DF033)

Shutterless Far-Infrared Camera Module

Tamron has successfully developed a Shutterless far-infrared camera module that does not require calibration[2] by means of a mechanical shutter. This lets users watch over someone for nursing or family care without interrupting their sound sleep because there is no shutter noise and videos are not interrupted part of the way through. By combining the far-infrared optical technologies and image processing technologies that Tamron has acquired to date, it is now possible to detect the temperature even in a pitch-black environment and record footage. This technology can be used to detect people, enabling night-time monitoring without lighting equipment, and to detect abnormal temperatures for equipment monitoring.

Shutterless Far-Infrared Camera Module

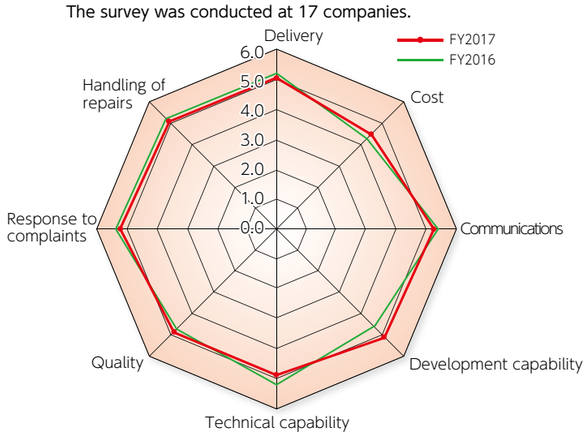
2. Calibration refers to corrective processing of the variation in images that occur due to far-infrared light optical characteristics, and various factors such as operating temperature and the shutter.

Evaluation by Distributors and OEM Customers

Each year, we ask our OEM customers and Tamron brand distributors to complete a customer satisfaction survey. The results of this year's survey mirrored that of the previous year, with Tamron meeting its target to receive an overall score of 5.0 points. In the "development capability" category, which was down in the previous year, we received favorable comments such as that "there was an increase in the number of attractive products," and recorded a highly regarded score of 5.1 (+0.5 compared with the previous year) this year. Looking ahead, Tamron will devote all its strength to responding to the needs of its customers.

Results of Customer Satisfaction Survey in 2017 (OEM Customers and Distributors)

The survey was conducted at 17 companies.



1.Very dissatisfied 2.Dissatisfied 3.Slightly dissatisfied
4.Slighly satisfied 5.Satisfied 6.Very satisfied

	Delivery	Cost	Communications	Development capability	Technical capability	Quality	Response to complaints	Handling of repairs	Overall
FY2016	5.2	4.3	5.4	4.6	5.2	4.8	5.4	5.2	5.0
FY2017	5.1	4.5	5.3	5.1	4.9	4.9	5.3	5.1	5.0
Gap	−0.1	+0.2	−0.1	+0.5	−0.3	+0.1	−0.1	−0.1	0.0

Expanding After-sales Services Globally

This year marks seven years since Tamron started its "worldwide 3-day repair turnaround program," where it returns repaired products within three days of receipt. In addition to providing technical support to overseas subsidiaries, distributors and domestic contractors, Tamron pursues activities ensuring that it can provide services tailored to the characteristics of each market.

For the Japanese market, Tamron provides the Tamron Lens Life Members program, which provides members with services such as discounted repair fees. While customers can register for the service free of charge online, we have also begun accepting written registration applications in an effort to cater to customers who are not familiar with PCs. We make every effort to ensure our services are available to customers of all ages.

Through our repair acceptance desk in Ueno, Tokyo and the Tamron Lens Customer Service Desk telephone service, we will continue to field customer feedback to share internally as we strive to make further improvements to our products and services.

Enhancing our Technological Development Capabilities

Automating Assembly (Japan)

Having declared the goal of developing a production line with no human intervention, Tamron began to introduce assembly automation lines from FY2017, and is rolling out the systems on a sequential basis. As a precursor, we installed automated assembly equipment for the lens barrels of each lens group. By linking the transitions between each process with automated conveyors, we successfully developed a line capable of fully automated production. In developing the equipment, we adopted design philosophy of highly versatile equipment using as few custom parts as possible and also tried to make the units compact. This has enabled us to build a large variety of production lines.

Moving forward, we will look to automate processes that require a high level of proficiency and difficult tasks such as automated conveyance during inspection processes. In doing so, we will stabilize quality and steadily accumulate technologies and expertise. We aim to further boost productivity by rolling out these automated lines to each production plant.


Automated lens barrel assembly equipment

Initiatives to Boost Productivity (Overseas)

Assembly Management System at Tamron Optical (Foshan) Co., Ltd.

Tamron Optical (Foshan) has installed an assembly management system uniquely developed to meet production needs. By digitizing record processing and management that was previously performed on paper, real-time results can be monitored, the notification process in the event of a fault has been simplified, and fault trends can be analyzed. The system also supports employee training. Training can be provided using operating standards (procedures) so that employees can easily understand the more challenging parts. By further digitizing assembly management, Tamron Optical (Foshan) aims to achieve efficiency improvements, visualization and cost reductions, leading to greater business improvement.


Assembly management system

Improving the Polishing Process at Tamron Optical (Vietnam) Co., Ltd.

Tamron Optical (Vietnam) was established in 2013, and it has been already five years since then. The production of many products is continually being transferred from Tamron Optical (Foshan) . The ratio of in-house machining rose to three times that of 2016 levels. In an effort to stabilize quality and improve the efficiency of production, improvements were made to machining methods during a section of the lens component polishing process. Work that was once performed with a single grip is now carried out using three grips, allowing the process to be carried out in sets of three lenses. As a result, machining productivity has improved three times within the same time period.


Grips during polishing

Environmentally Friendly Design

Tamron performs product assessments starting from the design stage. Of the various product assessment items, particular emphasis has been placed on effective management of the light weight design and reduced volume items. Environmentally friendly design results with respect to new models released in FY2017 included a 0.7% increase in light weight design and a 1.3% decrease in volume.[1] The main reason for the increase was the switch to metal for some components to improve interchangeable photographic lens performance and fit design concepts. Moreover, Tamron practices the appropriate management of chemical substances based on its internal Environment-related Substance Management Regulations, which reflect the requirements of the RoHS directive and the REACH regulation. Tamron products that feature environmentally friendly design bear the Tamron Eco Label.[2]

Following on from its efforts in 2016, Tamron proceeded with efforts to standardize production lines and equipment. We have standardized different production line equipment for photographic and industrial-use optics businesses, which are now operating lines for new products. We will continue these efforts to reduce the environmental impact in terms of resources and energy consumption during production.

1. Calculated using production volume from FY2017comparing conventional models.
2. For more information about Tamron Eco Label certified products, please visit the Tamron website:
WEB http://www.tamron.com/csr/environmental_activities.html

Tamron Eco Label
The label was designed to resemble an eye gently looking at our economy, society and environment. The eyebrow symbolizes a flowing stream of air and water, the pupil represents the green in the earth, and the tree in the pupil stands for our work for the three Rs of "reduce," "reuse" and "recycle."

Lens Assessment Item Table

Evaluation Items	
1. Extended usage of lens	7. Reduced use of packaging materials
2. Light weight design	8. Use of recycled materials for packaging materials
3. Reduced volume	9. Product labeling requirements
4. Energy efficiency during usage	10. Packaging labeling requirements
5. Use of recycled materials	11. Proper management of controlled environmental substances
6. Ease of disassembly	

Component Recycling

In particular, we have been focusing on reducing the amount of plastic waste generated, which amounted to over 150 tons per year. In order to reduce the amount of waste deriving from manufacturing processes, the rear caps for Tamron's DSLR camera lenses are made using 100% recycled plastic runner materials.[3] From FY2010 to FY2017, we used a cumulative total of 147 tons of recycled material (in 6.66 million rear caps) . Tamron has also considered new recycling methods at Integrated Design, Production Technology and Production Sub-committee meetings to further promote recycling. As a means of reducing waste while maintaining quality standards and ensuring that product functionality is not affected, Tamron adopted "Pre-consumer Closed Recycling, which involves mixing recycled materials with virgin materials. Since FY2017, Tamron started to utilize these recycled materials for the mass production of the filter screw rings, a component of interchangeable lens for SLR cameras. Tamron will continue to expand the introduction of recycled materials in components, examine new areas to target and promote waste reducing and recycling.

3. Waste material that occurs when pouring plastic resin during the production process.

The Process of Pre-consumer Closed Recycling