

# atos®



MT319-15/E

**Elettroidraulica Electrohydraulics 电子-液压 Elektrohydraulik Электрогидравлика**

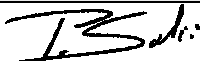


## Quality Plan

*standard*

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Revision	Issue Date	Approval
QPS-001-14-E/0 Rev.0	01/10/2014	P. Salvini 

## 1 Company profile

### Atos Group – consolidated data

**Personnel:** 450 included temporary employees

**Turnover:** 90Mio/€

### ATOS spa

**Personnel:** 293 included temporary employees

The average age is 44 years old (47 for 4 directors);  
56% have high school or bachelor degrees

**Turnover:** 77Mio/€

### Main company's divisions:

- Valves Division: pumps, on-off and proportional valves, manifolds and systems
- Cylinders Division: cylinders and servocylinders
- Electronic Division: electronic drivers and axis cards

### Main manufacturing plants

Sesto Calende plant - Italy Surface under roof : 24.000 m<sup>2</sup>

Valves Division: vane and pistons pumps, conventional valves, modular valves, on-off valves, proportional valves, manifolds and complete electrohydraulic systems, more than 1.000.000 pcs. per year

Electronic division: analog and digital drivers for proportional valves, LVDT position and pressure transducers for proportional valves, digital axis cards for motion control, more than 100.000 pcs. per year

Modena plant - Italy Surface under roof : 5.000 m<sup>2</sup>

Cylinders Division: oleohydraulic cylinders and servocylinders, more than 35.000 pcs. per year

### Other manufacturing plants

Atos (Shanghai) Hydraulics Co.,Ltd Shanghai- China

Surface under roof: 8.000 m<sup>2</sup>

On-off valves, modular and conventional valves, 100.000 pcs per year

Perucchini, Omegna - Italy Surface under roof : 11.000 m<sup>2</sup>

Cast iron and steel, Shell-moulding foundry, 10.000 tons per year

Est Due, Trieste - Italy Surface under roof : 3.000 m<sup>2</sup>

Modular and conventional valves on Atos design, over 200.000 pcs per year

Est Due, Sesto Calende - Italy Surface under roof: 1.000 m<sup>2</sup>

CNC mechanical machining of Atos designed parts



Sesto Calende plant



Modena plant



Atos Shanghai plant



Perucchini Foundry

# Quality Plan Standard



QPS-001-14-E/0

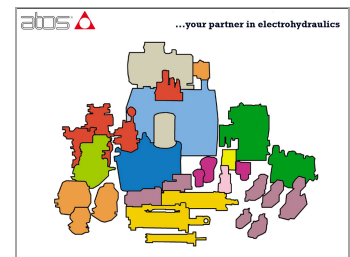
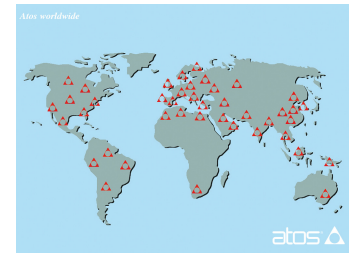
## 2 Quality Highlights

### Quality Policy

Atos is always intending to achieve and maintain its main targets according to the Constant Improvement philosophy. This leading principle must be followed up and integrated in the company working style for an ongoing growth of corporate activities.

The guideline to achieve these targets are:

- Guidance to the Customer Satisfaction, namely the development of effective and proactive relationships providing a Quality Service based on product conformity starting from technical and commercial requirements
- Cost reduction of quality defects caused by the incorrect application of the Quality System; reduction of scraps and improvement of the efficiency of all activities in any Organization level by optimizing working methods and times
- Strict collaboration with suppliers to get progressive and constant improvements of the range of purchased products and services by increasing the Quality level and the competitiveness of overall costs
- Improvement of the sensibility, the team work attitude and the care of Quality targets in every level of personnel. It is taken good care of human resources management by qualifying the personnel through specific training courses
- Computerization of the production process and individual workstation throughout the company, in order to comply with requirements of traceability and production control



ISO 9001:2008 Certificate

Quality and production requirements, design capabilities, Marketing activities and staff aspirations have to merge into a wide corporate project making persons aware of their responsibilities and more and more involved in a continuous growth of Atos.

### Quality System conforming to ISO 9001:2008 supplemented with applications and methods of ISO TS 16949 Technical Specification

In a more and more competitive global market, the Quality of product plays a basic role in customers satisfaction and therefore in having a successful business. In continuous improvement perspective, Atos has decided to integrate the Quality Management System conforming to ISO 9001:2008 norm with applications and methods of ISO TS 16949 technical specification mainly applied in the Automotive market. The most significant methods used by Atos are: **DFMEA, PFMEA, CONTROL PLAN, SPC, PAP, KAIZEN.**



ISO 14001 Certification

### Environment Safety Certification ISO 14001 and BS OHSAS 18001

In 2013 Atos has obtained the compliance with European certification EN ISO 14001 (Environmental Management System) and OHSAS 18001 (occupational health and safety management system). This important achievement has positive effects into the internal organization. The main advantages are:

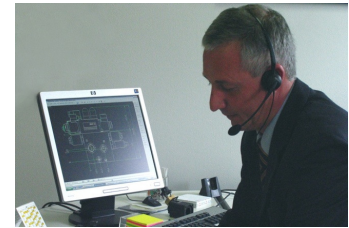
- Reduce the cost of waste and pollution
- Reduction in the consumption of energy and materials
- Minimization of risks for workers



BS OHSAS 18001 Certification

## Sharing of quality policy with all corporate levels

The Quality policy and the most significant trend indexes are shared with all operating services and departments. The main goal is to maximize the involvement and participation of all company personnel in regards to Quality subjects. Everyone has the right and duty to notify possible inefficiencies or nonconformities both of product and service. Each report will be always checked by services in charge; appropriate and corrective actions will be targeted and put in the field.



Partnership with Customers

## Strong partnership with customers and suppliers

Atos policy promotes strong partnership with customers and suppliers; close technical relationships with customers enable a thorough knowledge of products and applications, thus developing products able to meet all the requirements and suitable for the relevant application. The partnership with suppliers builds up and promotes their involvement in the company policy of continuous improvement; therefore the supplier becomes an active partner in the process of growth and improvement of Quality standards.



Technical session

## Personnel with high competence

Atos invests a lot of resources in staff training at all corporate levels; the competence of staff plays a fundamental role to reach and maintain high quality standards over time and, in addition, to promote the policy of continuous improvement. The training courses are planned with reference to the Skills Matrices, that point out and relate the individual skill to the running working activity, so any possible gap can be easily filled. In addition specific training are scheduled and focused on new methodologies learning (see ISO TS) or on using of new working tools.



Hand-on training

## Suppliers with certified Quality System

For further higher quality assurance of purchased components, Atos suppliers have a certified quality system according to ISO 9001 or ISO / TS 16949 Quality Management System or their own quality system aligned to ISO 9001 standards. All suppliers are approved through joint Audit carried out by Quality and Purchasing specialists and their status of Atos supplier is maintained by continuous monitoring of their trend indexes particularly the PPM (Parts-Per-Million) nonconformities. The evaluation of suppliers by Vendor Rating is issued every six months. Suppliers with underperforming VR index respect to Atos' target are called to jointly define proper countermeasures to restore the targeted quality rating. The partner suppliers that reach the highest evaluation are awarded with the title of "Supplier of the Year".



Top Supplier Award

## SAP management software

In order to further improve the efficiency and integration among the several business divisions of the Atos Group, from the beginning of 2013 Atos has adopted SAP software for the whole company management.

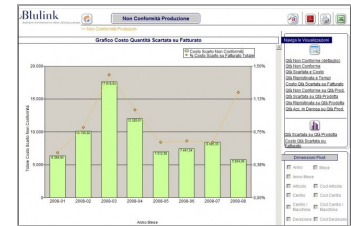


SAP management software

## Software for Quality Management

Quality activities are managed by the support of a specific software; the IT solution is able to ensure the effectiveness of operations and greatly increase the efficiency of the corporate organization. The software includes a wide range of application modules, covering the requirements of the Quality system in regards to the most strategic areas such as: Quality Control, Metrology, Equipments Maintenance, Problem Solving, Non Conformities, Customer complaint and Statistical Process Control.

The analysis of the complaints is managed with 8D method that provides excellent guidelines to identify the root cause of problems and put in action the eventual corrective procedures.



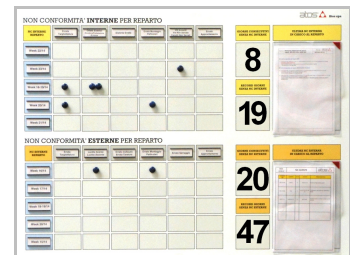
Quality Software

## Punctual Analysis of NonConformities, for a continuous improvement

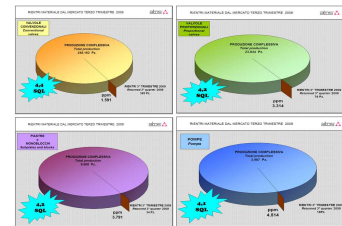
The Non Conformities are split in three main groups:

- External Non Conformities, reported by customers
- Internal Non Conformities, reported by departments or services
- Non Conformities in material entrance, dependent on suppliers

Each Non Conformity is carefully analyzed, developed and resolved with corrective actions, according to the Problem Solving method. The quality dashboards are updated weekly in the production departments to show the records of the internal and external Non Conformities and to involve the staff in the continuous improvement. With quarterly frequency, the quality department prepares the quality statistic analysis that is shared with all the departments in order to jointly define and implement improvement actions in any process of the company.



Quality Performance dashboard

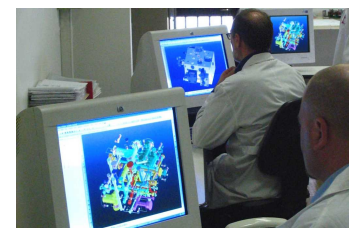


Nonconformities analysis

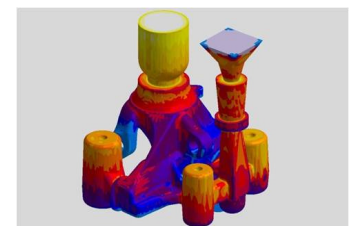
## Specific software for design and DFMEA method

Atos design service uses specific software, able to analyze the requirements of products just in the early development phase and to define all the relevant activities of the technical office.

- **CFD** (Computational Fluid Dynamics) performs calculations of pressure losses and fluid forces generated by the fluid flowing into the valve
- **IST** Spring Design allows to calculate the loads and the geometrical parameters of a spring, besides it allows to check its performances under fatigue stress
- **IBIMEC** allows to apply DFMEA method in the component design. It also makes immediately available the company know-how through the analysis of the historical experiences up to the definition of a specific product
- **FEM** (Finite Element Method) checks the structural strength of a mechanical device.



Design Software



Software for functional check

**Significant equipments at the R&D department**

Atos R&D department is provided with the necessary equipments needed to carry out functional and performance tests on products and components; in addition specific machinery are able to simulate the most critical applications which Atos products could be applied to. The functional tests are performed both during the feasibility study of a new product and on large serial production. The R&D plays a fundamental role in identifying functional limits and weak points of the product, allowing designers to work and focus on the improvement of Quality, Reliability and Performance standards.

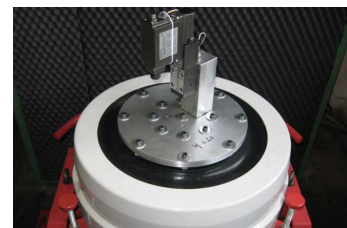
EQUIPMENT TYPE	EQUIPMENT MODEL	TESTS PERFORMED	REFERENCE STANDARDS	TESTS DESCRIPTION
SALT FOG CHAMBER	WEISS SC 450	SALT SPRAY TEST CONDENSED WATER TEST	UNI EN ISO 9227 UNI EN ISO 6270-2	Test performed with a standardized solution of NaCl used to check corrosion resistance of coated samples
SHAKER	LING DYNAMIC SYSTEM V830-335 SPA16K	MECHANICAL STRESS AND VIBRATION ON 3-AXIS	EN 60068-2 DIN 40046	Sinusoidal oscillation Random oscillation on X/Y/Z Shock test
THERMAL CHAMBER	WEISS WT 120/70	THERMAL TEST RANGE -70°C +180°C		Functional tests of component with hydraulic and electric connection in real working conditions
CLIMATIC CHAMBER	WEISS WK3-180/40	THERMAL TEST TEMP. RANGE -40°C +180°C HUMIDITY RANGE 10 – 98%	DIN IEC 60068-2- 14 DIN IEC 60068-2- 30 DIN IEC 60068-2- 38	Functional tests of component with hydraulic and electric connection in real working conditions with humidity
IP PROTECTION DEGREE TEST	WEISS SWT 1000	IPX6 ÷ IPX9K	DIN 40050-9 CEI EN 60529	Analysis of IP protection class provided by enclosures of electronic components
INFRARED CAMERA	SAT-G 90	-20° ÷ 1500° 7,5µ ÷ 13µ		Photo and video in infrared wavelength. Resolution ±80mKa 30°
FATIGUE TEST	VARIOUS SYSTEM	FATIGUE TEST ON PRODUCTS FATIGUE TEST ON COMPONENTS		24/7 wear tests to verify reliability of products and components



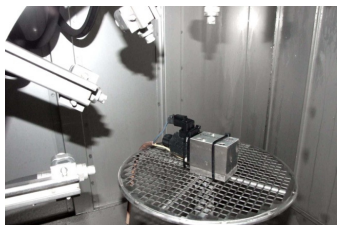
Salt fog test



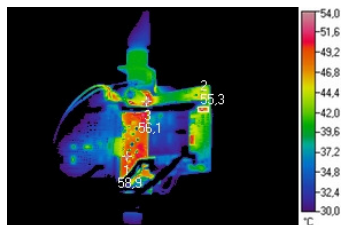
Temperature and climatic test chamber



Electrodynamic shaker



IP protection degree test



Infrared camera



Fatigue test

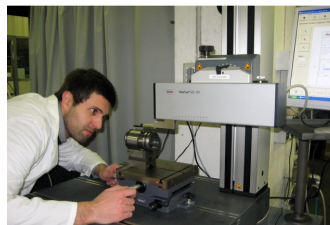
**Significant equipments at Quality Assurance department**

The Quality Assurance department is provided with forefront machinery and equipment able to monitor automatically or semi-automatically the conformity of the components manufactured in-house or from suppliers. The controls are defined according to the critical points of each component, and according to the supplier's VR. The quality and sampling plans are managed dynamically according to the number of conformed supplies and they are set on three levels: low, normal or intensive. Suppliers having high quality level maintained over the years, work under Free Pass; however all suppliers are required to prove and state the results of their own inspections and tests. The QA dept is capable of supporting suppliers as well as the internal operational departments whenever specific instruments or customized inspection are required.

EQUIPMENT TYPE	EQUIPMENT MODEL	MEASURING RANGE	RESOLUTION	EQUIPMENT CHARACTERISTICS
3D MEASURING MACHINE	DEA IOTA 0102	X 910mm Y 610mm Z 410mm	0,1μ	Renishaw probe PH10, SW TUTOR and PC-DMIS
3D MEASURING MACHINE	DEA GLOBAL 071005	X 700mm Y 1000mm Z 500mm	0,1μ	Renishaw probe PH10, SW TUTOR and PC-DMIS
ROUNDNESS TESTER	MAHR MMQ 44	X 180mm Z 350mm	0,01μ	Automatic probe T7W, SW FORM-PC
ROUNDNESS TESTER	MAHR MMQ 44	X 280mm Z 500mm	0,01μ	Semiautomatic probe T7W, SW FORM-PC
UNIVERSAL LENGTH MEASURING MACHINE	JENA 01-600C	Length 0÷600mm	0,1μ	Calibration of measuring instruments SW QM-SOFT
OPTICAL SCANNER	HOMMEL-ETAMIC C310	∅ 6÷100mm Length 350mm	0,1μ	Measure outside diameters SW TURBOPTIC 3
OPTICAL MEASURING	SMART SCOPE MVP 250	X 300mm Y 150mm Z 150mm	0,5μ	Motorized lens x27÷x175 SW Measure-X
MICROSCOPE	LEICA DM6000M	X 76mm Y 50mm	0,3μ	Motorized lens x1 x1,5 x2 x6
PROFILE PROJECTOR	SCHNEIDER P500	X 200mm Y 100mm	1μ	Display MULTICOUNT 2000 magnification x10 x25 x100
HARDNESS TESTER	DURAVISION 200	1÷250Kgf	0,01	Rockwell, Brinell, Vickers, Knoop e per materiali plastici
MICRO HARDNESS TESTER	GIBITRE MULTI UNIT TESTER	1÷100SH	1SH	Shore A, Shore D, Micro IRHD
ROUGHNESS MEASURING STATION	MAHR MARSURF XR20	X 120mm ±750μ	0,001μ	Probe GD 120 SW MAHRSURF XR20
SPRING TESTING SYSTEM	EASYDUR DYNO	0÷300Kg 0÷300N	0,001Kg	Three load cells 300Kg - 50Kg - 5Kg
BALANCE	OHAUS DISCOVERY	0÷81g 0÷210g	0,01mg 0,1mg	Weighing, Weighing %, Dinamic weighing, Density



3D coordinate measuring machine



Roughness measuring station



Optical measurement system



Roundness tester



Spring testing instrument



Universal length measuring machine



## Forefront and highly reliable production machine

For in-house production of components, Atos uses the most advanced machines able to perform high productivity and capability and to grant high quality standards.



High precision machining centers

## Galvanizing plant for ECP surface treatment

Atos has developed an innovative treatment of surface protection for its products called ECP (Enhanced Corrosion Protection Cr +6 free), able to provide high resistance against corrosion over 200h (salt spray test UNI EN 9227).

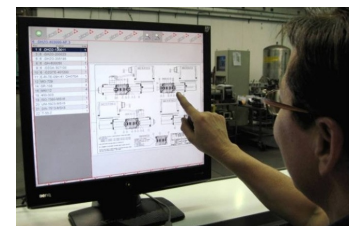
The forefront galvanizing plant grants high quality and repetitive zincing protection to all valve bodies and component parts.



ECP surface treatment plant

## Assembling benches with PC's displaying drawings, part lists and visual instructions

The assembling benches are equipped with touch screen monitors connected to Atos' intranet network. Once the unique barcode related to valves order is read, all the updated information needed to assemble properly the valve are displayed and available for the operator such as drawing, technical specifications and Visual Instructions. This important improvement optimizes the assembling operations by reducing possible errors and improving the order and layout of workstations thanks to paper documents removal.



Visual Instructions

## Acceptance test on 100% of production

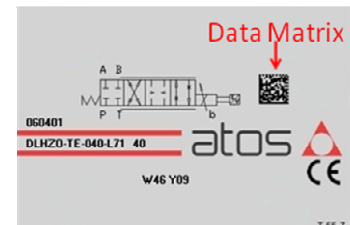
All Atos products are 100% tested; it allows to detect and identify possible functional nonconformities, before components are supplied to the customers. The test benches are fully automated to minimize the human error and to operate more efficiently and effectively thanks to preset test cycles tailored and selectable for each component. Any possible nonconforming product detected during the test is immediately rejected and delivered to the relevant department for analysis and overhaul.



Automatic testing benches

## Univocal traceability of testing data through Data Matrix

Data Matrix is a bi-dimensional bar code able to record a lot of information regarding the valve production and testing. Data Matrix is etched by laser on the valve nameplate for an immediate and univocal traceability of every single component; beside, it allows to combine performances and information measured during the valve's functional test. Main information recorded in Data Matrix: references of customer purchase order / acknowledgement, operator who carried out the test, reference testing bench, measured parameters during functional test.



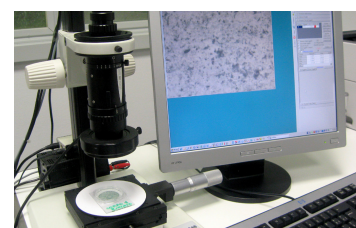
Data Matrix traceability code

## Systems for the analysis of fluid contamination

Atos production testing benches are equipped with a in-line system for fluid contamination analysis (ICM) to constantly monitor the fluid cleanliness level in compliance with International Standards ISO 4406:1999, NAS 1638; AS 4059 and ISO 11218.

## Systems for the analysis of components contamination

Atos lab is equipped with Cleanliness measuring instruments (washing cabinet, microscope, precision balance) for the analysis of the cleanliness level on its components according to ISO 18413, ISO 16232, ISO / TR 10949. Atos constantly examines the state of its products, pays particular attention to the study of the possible origins and implements measures to improve the components cleaning.



Cleanliness Measurement

### 3 Purpose of the Standard Quality Plan

This Quality Plan, edited in conformity to UNI ISO 10005 norm, shows the procedures carried out by Atos to comply with the quality requirements applied to the production of components. The document has been deliberately issued in synthetic form and with general purpose contents because specific information are just included into the Quality Manual. Atos manufacture standard components, reported on technical catalogue, and special execution products as well; consequently the Quality Plan differentiates the specific activities related to both production lines.

If the contents of this document do not comply with the customers' requirements, they could inquire to the Atos Quality Assurance Service a registered copy of Quality Manual. This document is considered under "not controlled distribution".

### 4 Atos and Quality Assurance

The Atos management system is in accordance with a Quality System conforming to the UNI EN ISO 9001:2008 standard.

The Quality management system certificates nr. 178/95 and 179/95 has been achieved via notified body R.I.Na. (Registro Italiano Navale) on 1995; whereas notified body CSQ released the later extensions. Nowadays only one quality system document nr.9105 certifies the three company divisions. Quality has been always a key point for Atos, specifically matured by managing orders according to quality assurance requirements for civil, naval and military applications.

#### Main supplies programs, managed according to the Quality Plan

Customer: ALENIA-OTO MELARA, Italy

Supplying: tilting and levelling cylinders for missiles launching ramp system SAMP-T. Lifting and stabilizing cylinders for armoured vehicle type B1  
Reference norm: NATO AQAP-1&4 (indirect qualification for Defence Admin)

Customer: TRW Pamplona, Spain

Supplying: control valve for rear axle power steering of trucks  
Reference norm: ISO TS 16949

Customer: CAT Paving System Minerbio, Italy

Supplying: manifolds and modular groups  
Reference norm: ISO TS 16949

Customer: National Oilwell Varco Huston, Orange, USA

Supplying: Atex certified on-off and proportional valves  
Reference norm: Explosion proof Atex

Customer: Alstom Power IST

Supplying: oil-hydraulic systems, servocylinders, manifolds for industrial steam turbines  
Reference norm: ISO 9001-Alstom standards

Customer: General Electric – Nuovo Pignone

Supplying: manifolds, Atex certified on-off and proportional valves, cylinders  
Reference norm: Explosion proof Atex

#### Certificates and qualifications achieved in Quality system

##### *Quality system*

- Dedicated Quality Plans to manufacture components in compliance with ATEX and PED directives
- Registration to the supplier and bidder lists of the Defence Administration for following components categories: motors, pumps and hydraulic servocontrols, piston and vane pumps, fluid dynamic devices for remote control
- Registration into vendor lists of important groups operating in automotive, energy, steel and mining Industries

### Product certifications:

- Explosion-proof ON-OFF and proportional valves also with integral driver and intrinsically safe valves for applications in hazardous environment and mining; they are certified according to ATEX , UL and Gost-R Rostekhnadzor directives
- Explosion-proof valves for applications in hazardous environment; they are certified according to IECEx international safety standard
- Cylinders and pumps for use in explosive environmental; they are certified according to ATEX directives
- Safety manifolds for hydraulic press-brakes, certified by TÜV Italy
- Safety manifolds for hydraulic bending presses, TÜV Italy approved
- Pressure relief safety valves certified according to PED directives
- UL 429 & CSA 22.2 approved directional on/off control valves with coils in class H for standard applications
- Safety solenoid valves and cartridges with integral mechanic microswitch or integrated inductive proximity sensor or inductive position sensors, TÜV-Italy
- Ex-proof solenoid valves spool type and free-leakage poppet type conform to SIL3 safety level according to low demand mode operation, TÜV Italy
- All Atos valves are PCT certified, according to GOST (Russian mark equivalent to CE)  
All above mentioned certifications are available on our web site [www.atos.com](http://www.atos.com)

## 5 Duty responsibilities

Hereafter the relevant services of Atos organization that are responsible for the implementation of the Quality Plan:

- ASQ: ensure that the activities required by quality management system are planned, implemented and controlled by monitoring their development
- ASQ: determine the sequence and interaction of processes related to the Quality Plan
- ASQ: communicate requirements to all involved company services and divisions, subcontractors and customers. Solve issues that might come out at interfaces among these groups
- ASQ: double check the results of performed audits
- DGE: authorizes requests for exemptions to Atos Quality Management System procedures
- ASQ: monitor corrective and preventive actions
- DGE: review and approve changes to the Quality Plan or deviations from it

DGE : General Management

ASQ : Quality Assurance

Quality reference documents: QA-002-01-ASQ, Quality Manual

## 6 Checking of documents, data and records

All Atos documentation is identified, registered, protected and preserved in accordance with qualified criteria conforming to UNI EN ISO 9001:2008 norm.

All internal documentation is managed through specific procedures and specifications that define modes and responsibilities for their processing, coding, distribution and review.

Responsibility of the external documentation management falls on the reference department who is in charge of the specific activities of management, registration and distribution.

The external documents (norms, technical specifications of the customer) are considered under controlled distribution and they are registered in special lists drew up and updated periodically by QA dept. The data management is carried out by Atos both on paper and on data processing supports according to the running software used for management, design and usual practice and handled by the IT dept.

The records are identifiable, traceable and preserved for a minimum of three years.

The Quality reporting will not be disclosed to entities outside the company except for specific agreement with the end customer during the "contract review".

Quality reference documents: QA-005-01-ASQ, QA-005-02-ASQ, QA-005-03-ASQ, SAS-003-D

## 7 Training

Staff training is handled at all company levels according to defined procedures and skills required for specific roles or functions. QA dept is responsible for the program management, training and refresh courses.

Quality reference documents: QA-018-01-ASQ

## 8 Order processing and customer service

All customer notes, specifications and purchase orders are analyzed and checked in the “review of contract” according to established procedures.

Commercial (COM \*), technical support-to-sales (ITEC) and technical dept. (TEC) are responsible for analysis and development of technical-commercial inquiries.

Atos has its own customer service with high skilled personnel normally engaged in R & D activities. The requested onsite technical assistance is recorded on a proper forms and it is always supported by specific technical reports sent to the customer.

Service dept (REV / ASS) is responsible for the management of goods returned for in-house inspection. ASS/REV is supported by R & D, Quality Control, QA and Production dept. whenever specific analysis and test are required.

Quality reference documents: QA-003-04-COM, QA-019-01-TEC, QA-019-02-PRO

## 9 Research & Development

Atos design is managed separately by each one the three divisions; each one is responsible for the relevant product range. Products design is developed by two different services: technical office that is the responsible of components design; R&D that is responsible of testing procedures and products validation.

The “Design Plan” is worked out by the technical dept. and, in case of standard product, it must be approved by Marketing dept. and General Management; whilst, in case of special product, the final approval is from customer. The planning and management activities of products design are defined by implementing DFMEA method that involves several company services.

The control and validation of the standard design are always carried out by testing one or more prototypes according to a qualification trials program prepared by the R&D dept.

The engineering development of special products is normally carried out by testing the “first sample” on the end-user machinery and by involving the customer for final approval.

Test and verifications reports are always registered into the Project Plan.

Quality reference documents: QA-004-01-TEC, QA-004-02-TEC, QA-004-03-TEC, QA-004-04-TEC

## 10 Outsourcing and suppliers' management

Each of three Atos business divisions manages the purchasing activities separately from the others.

In order to maintain high quality rating of purchased components, Atos makes use of suppliers with quality system according to UNI EN ISO 9001-2008 or ISO TS 16949 or with own quality system aligned to ISO standard. Each supplier is qualified and constantly monitored through specific audits carried out by Atos QA and Purchase dept. specialists.

Suppliers' Vendor Rating (VR) is issued by three Atos business divisions every two quarters in order to monitor suppliers' performances in terms of quality of supplying, reliability of delivery terms, flexibility and technical support forwarded to Atos. Suppliers with underperforming VR index respect to Atos' fixed target are called to jointly define proper countermeasures to restore the required quality rating.

Atos carry out specific frame agreements with suppliers having a VR higher than a fixed bench mark, long term high quality rate of supplies and strong technical relationship with Atos; this agreement includes self-certification and Free Pass.

The PAP procedure (Product Approval Process), derived from Automotive PPAP, is also active for the verification and validation of products manufactured by new suppliers or by already approved suppliers in case of changes in their production process.

The purchase orders are formalized on specific numbered forms, including the contract terms fixed in the relevant supplier's contracts.

Quality reference documents: QA-006-01-PRO, QA-006-02-PRO, SAS-465-Q

## 11 Production

The internal and external machining are managed through manufacturing and inspection cycle worked out for all types of components according to defined procedures.

Assembly and testing activities are managed through order and bill of material, supported by technical specifications and visual instructions for the assembly and testing operations of the specific product. In **section 19** flowcharts of the standard production process of the three Atos divisions are reported.

Quality reference documents: QA-009-02-PRO, QA-009-03-PRO

### 12 Identification and traceability

The identification of parts and products is usually carried out by affixing the identification labels on the components. The critical parts are etched by punching or by laser.

The “primary material traceability” is applied only to the critical parts by affixing or marking specific codes through which it is possible to trace the manufacturer (supplier or Atos department), the production dating and the belonging batch.

The “finished products traceability”, applied on all Atos products through marking, allows to identify the name of assembler and inspector, the dating (week/year) and the test execution procedures.

In addition, the new identification procedures through Data Matrix code etched by laser on the valve nameplate is now running. It consists of a bi-dimensional bar code for an immediate and univocal traceability of all valves manufactured by Atos on functional testing basis.

Quality reference documents: QA-008-01-ASQ, QA-008-02-ASQ, QA-010-01-ASQ

### 13 Control of goods supplied by the customer

Whenever applicable, the products supplied by customer are identified and handled separately from Atos standards line. Their storage is managed in separated warehouse areas.

Unless specific agreements and prescriptions, standard control and management procedures are applied.

Quality reference documents: QA-007-01-PRO

### 14 Products preservation

All the parts managed in the company are handled, stocked and preserved through specific equipment and protections. The preservation against ambient decay is granted by coating protective products.

Packing for the shipment is realised by using different protections related to the package weight, the selected way of transport, particular customer requirements and running norms. To meet the growing market demand, Atos uses new ecological and effective paper based packing system which offers best mechanical protection, full compliance with environmental requirements as per ISO 14001 and a easier swallowing of the paper packing instead of others plastic fillers.

Quality reference documents: QA-015-02-PRO, QA-015-03-PRO

### 15 Checking of not conform products

Specific areas for the segregation of nonconforming products are well marked in all production departments. The products nonconformities both for simple part faults as well as finished product defects are always identified with coloured tags: red for material to be rejected; yellow for material to be checked and overhauled. The rejected product is quickly scrapped or returned to the supplier in order to prevent any possible misuse. The exceptionally accepted or repaired material is properly identified and managed to allow its traceability in any phase of production process.

The analysis of nonconformities is handled through the Problem Solving methodology. The non-conformities procedures can be issued by any company dept. and they are always registered on specific forms according to defined procedures. QA dept. determines the method to manage the nonconformity and the activities needed to analyze the problem, the service in charge of the analysis and the action planning to prevent future occurrence. In regards to technical issues, Technical dept. has the exclusive responsibility for the acceptance of exceptions or repairs.

Quality reference documents: QA-013-01-ASQ, QA-013-02-ASQ

## 16 Monitoring and measurement

Process control is an effective and objective method to detect products nonconformities.

Inspections and tests are carried out on three different phases basis.

**Acceptance sampling** is done by the acceptance control dept. according to a sampling plan based on three set levels according to the product complexity/function and the supplier's VR rate. Drawings of mechanical parts, operative and visual instructions are adopted as reference documents. The sampling results are processed through Quarta® Blulink, a specific software able to issue effective and precise survey.

**In line controls** performed by the machine tool operator and based on statistic sampling; they are supervised by the foreman and the responsible of on line controls. On line controls are registered on specific department registers or via acquisition data software. Design drawings and manufacturing operational chart are used for such a purpose.

**IPCQ (In Process Quality Control):** In addition to the standard in line controls, in order to monitor the most critical production process and to improve the working methods, the ASQ staff performs internal auditing activities to define the weakness of the process, relevant improvements and staff training.

**Final functional tests** are performed on all components by the testing operator and in accordance with the product test specification or automatic testing procedures.

The objective proof of the functional tests' execution is granted by the presence of the "product traceability code" and by Data Matrix etched on the valve nameplate.

All the instruments used to control and test components are encoded and registered on specific master registration cards. Their suitability is constantly verified by the QA personnel employed in metrological laboratory through the relevant controls established in the same master registration cards. The instruments verifications are carried out by using primary samples SIT or by relying on external accredited laboratories. The instrument management relies on the support of QMSOFT® specific software.

Quality reference documents: QA-010-04-ASQ, QA-010-05-ASQ, QA-011-01-ASQ, QA-012-01-ASQ

## 17 Audit, statistic survey, corrective and preventive actions

Quality audits are constantly carried out by the QA personnel both inside the Company structure and organisation as well as at the external suppliers.

The results of the inspections are always registered on specific forms, that are integral part of the Quality system documentation.

Statistical techniques are applied to monitor constantly the performances of the most significant indexes:

- External nonconformities reported by customers
- Internal nonconformities reported by departments or in-house
- Nonconformities dependent on outsourcers and detected in acceptance
- Controls and tests in acceptance and in production
- Products' overhauling
- After-sales Service
- Customers' claims
- Delivery delays
- Missing parts in production

Quarterly the QA dept. draws up the non-conformity analysis in accordance with defined procedures. In order to raise awareness and involve personnel at any company levels, quarterly the survey charts of the most significant quality indexes are displayed in the relevant showcases present in all production areas. Corrective and preventive actions come out from the analysis of product or service nonconformities that are registered through internal and external nonconformity claims as well as form audits carried out by the Notified Body. The accomplishment and effectiveness of the engaged corrective action is planned and monitored in subsequent audits.

Quality reference documents: QA-017-01-ASQ, QA-014-02-ASQ, QA-020-01-ASQ

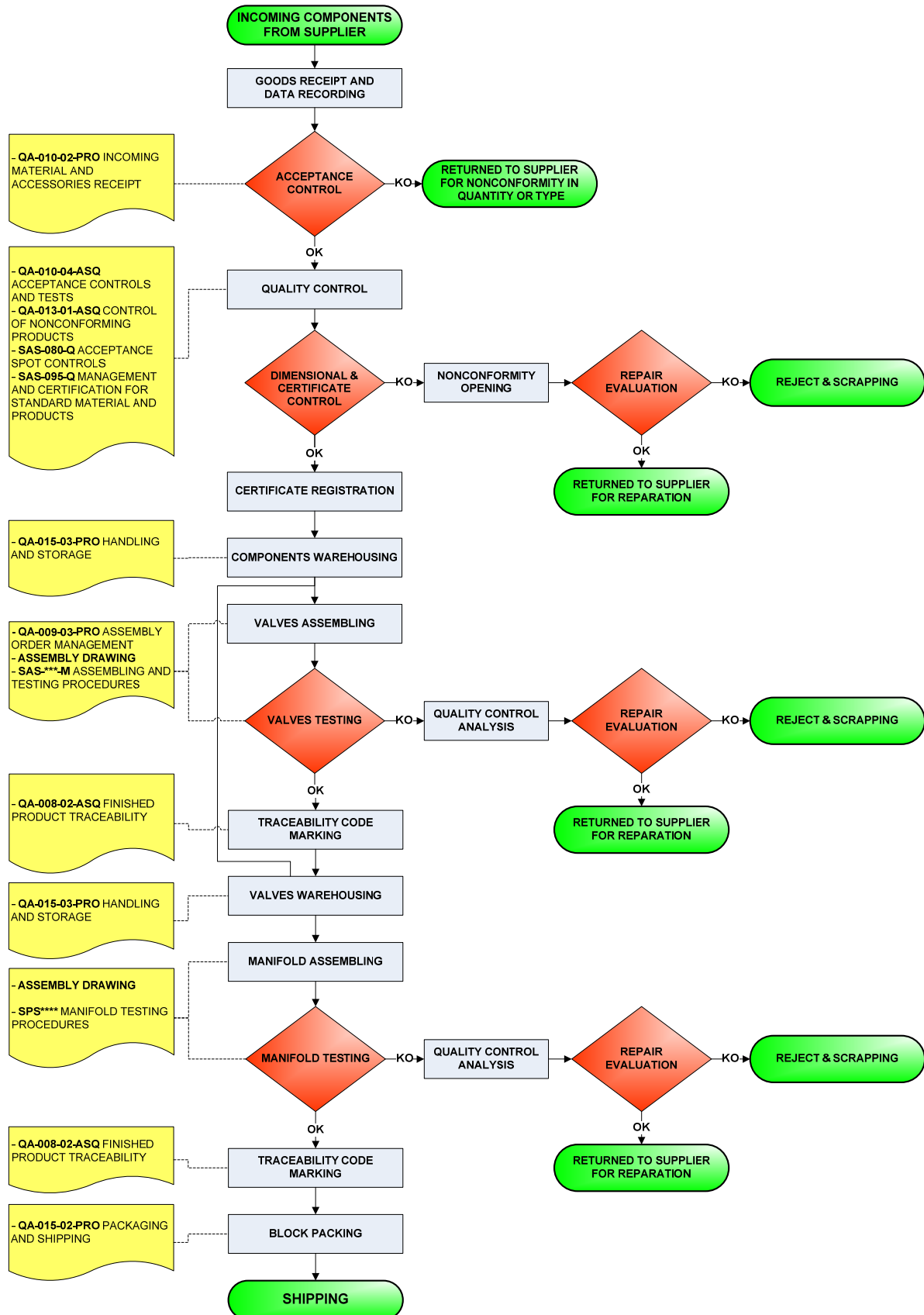
## 18 Employee Suggestion Program

Improvement actions are also born at operational level according to Kaizen approach through the "improvement suggestion card" submitted directly by the production workers to the management. These suggestions are evaluated one by one by a team of Quality, HSE and Production managers and then promptly applied.

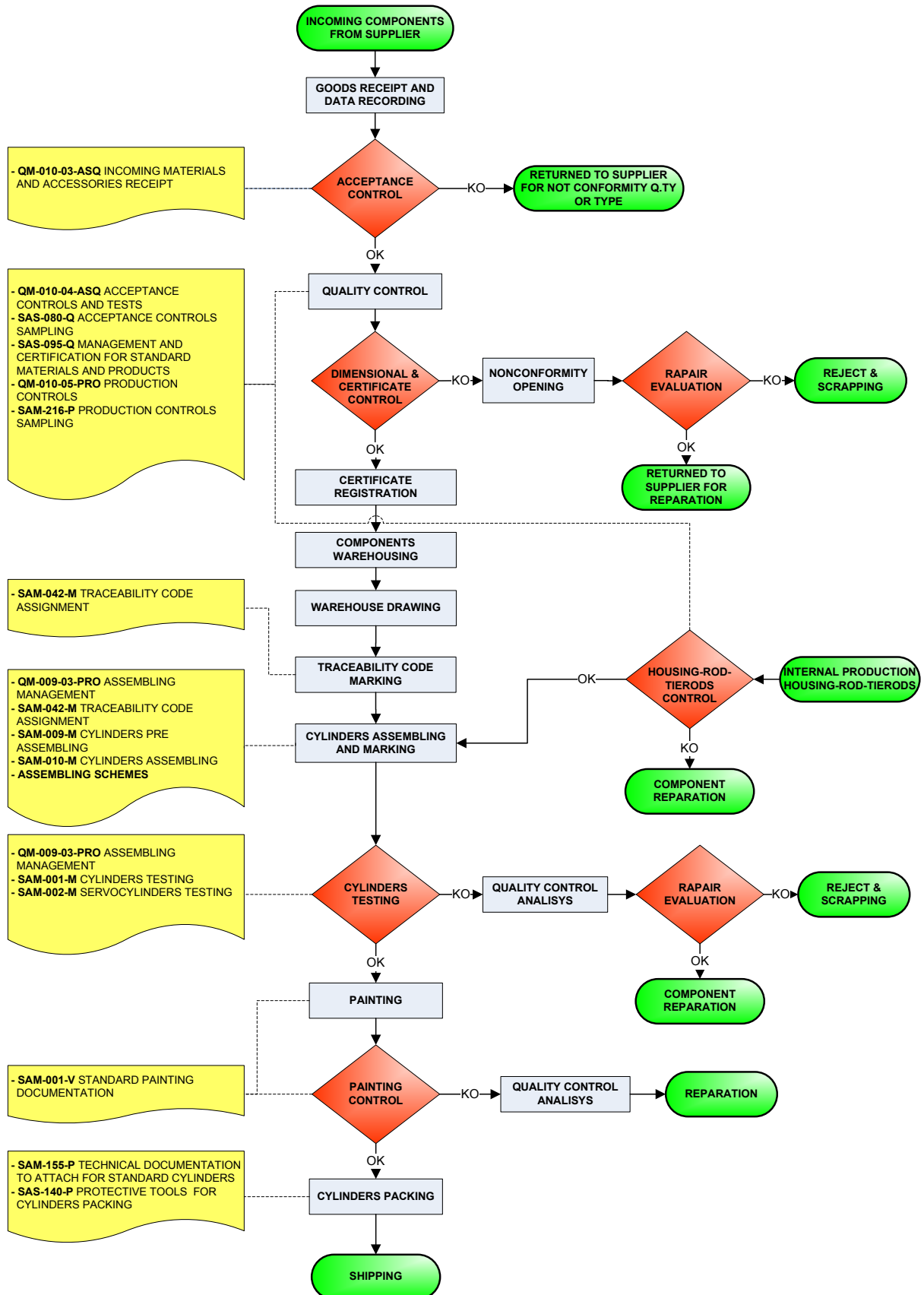
Quality reference documents: SAS-539-Q

19 Flowchart of the standard production process

19.1 Valves and manifolds division: production flowchart



19.2 Cylinder division: production flowchart





19.3 Electronic division: production flowchart

