QUALITY CONTROL IN THE FOOD INDUSTRY CONFORMING TO ISO 9000. PROCESS MAP AND PROCESS DIAGRAMS

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Abstract: Controllable factors that either positively or negatively influence the finished product are referred to as the quality control. The use of good and sound raw material is of primary importance for the achievement of the required end product of consistent quality. Identification of die critical points is essential since the process control relates to die processing results of the raw material. Traditional quality control is completely unable to eliminate quality problems, thus a preventive strategy based on thorough analysis of prevailing conditions which ensures that objectives of the quality assurance programme are met is recommended for the food industry. The Hazard Analysis Critical Control Point (HACCP) and Total Quality Management (TQM) embody these requirements as certified under the International Standard Organisation (ISO) 9000 series.

Keywords: ISO 9000, quality control, process map, diagram map

INTRODUCTION

ISO is a network of the national standards institutes of 157 countries, on the basis of one member per country, with the Central Secretariat in Geneva, Switzerland, that coordinates the system (van Looveren, 2002).

ISO is a non-governmental organization. As is the case of the United Nations system, its members are not delegations of national governments (Benteley, 1993). Nevertheless, ISO occupies a special position between the public and private sectors. This is due to two raisons:

- Many of its member institutes are part of the governmental structure of their countries, or are mandated by their government.
- Other members have their uniquely roots in the private sector, having been set up by national partnerships of industry associations (Tricker, 1999).

Therefore, ISO is able to act as a bridging organization in which a consensus can be reached on solutions that meet both the requirements of business and the broader needs of society, such as the needs of stakeholder groups like consumers and users.

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Acta Universitatis Cibiniensis Series E: FOOD TECHNOLOGY Vol. VIII (2004), no.2 Over the years, ISO has developed many of the standards against which products are assessed for conformity, as well as the standardized test methods that allow the meaningful comparison of test results so necessary for international trade. ISO itself does not carry out conformity assessment (***, 2001).

This paper offers process map and process diagrams in conformity with ISO 9000 to the user. Their use contributes to the optimally implementation of this standards family in the food factories.

RESULTS AND DISCUSSIONS

The vast majority of ISO standards are highly specific to a particular product, material, or process. ISO 9000 family is among ISO's most widely known standard ever. ISO 9000 has become an international reference for quality requirements in business to business dealings.

The standards that have earned the ISO 9000 has a worldwide reputation as "generic management system standards". "Generic" means that the same standards can be applied to any organization, large or small, whatever its product - including whether its "product" is actually a service - in any sector of activity, and whether it is a business enterprise, a public administration, or a government department. "Management system" refers to what the organization does to manage its processes, or activities. "Generic" also signifies that no matter what the organization is or does, if it wants to establish a quality management system or an environmental management system, then such a system has a number of essential features which are spelled out in the relevant standards of ISO 9000 family. At its simplest, "conformity assessment" means checking that products, materials, services, systems or people measure up to the specifications of a relevant standard. Today, many products require testing for conformance with specifications or compliance with safety, or other regulations before they can be put on many markets.

Even simpler products may require supporting technical documentation that includes test data. With so much trade taking place across borders, conformity assessment has become an important component of the world economy.

In figures 1 to 23 the process map and the process diagrams to be followed at the application of ISO 9000 in the factories are presented.

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	Management processes	
C	Planning SMI; 1 Politics;Management analysis2 Human resourcesHuman resources3 Human resourcesMaterial resources4 ImprovementContinually Improvement	C L I
I F		I E N
E N T	Value process Client 6 Relationshi 7 Project and 8 Logistic 9 orientation with client development Logistic 9	N T
R	Production 10 Sales 11 Environment 12 Preparing for emergency 13 aspects aspects situation and ability to answer	S A T
E Q U		I S
U E	Helpful Process	F A
S T S	Documents 14 Communi 15 DMM 16 Client 17 Audit 18 and registration cation cation control satisfaction intern	C T I
	Monitoring and 19 measuringMonitoring 20 measuringUn-conforming 21 product controlData 22 analysis	O N

Figure 1. Process map

Process owner: Management representative



Figure 2. Planning SMI. Politics and objectives

Process owner: Management representative



Figure 3. Management analysis

Process owner: Human Resources Manager

Standards SR EN ISO 9001: 2001	Who supplies ASRO	Req Last edition	uests	P Ii	rocedures, nstructions	Who HR De	o supplies partment	Requests Last revision
PROCESS ENTRANCES					PROCESS RESU	LTS		
Entrances	Suppliers	Requests			Results		Clients	Requests
materials: - IT support information: - company map - company standards - legislation - employers sheet - training courses - evaluation criteria - training efficiency - necessary skills for each position - employer self-evaluation questionnaire - studies diploma, trainings, qualification	IT office CA Chef of department. MO DG, Chef of department. Chef of department. Employer Work Inspection Chef of department	Reliable Complete, adequate, easy to read	Hur Reso Manas	nan urces gement	 Annual trainings Employer evalua Efficiency evalua Employer satisfa level employee awarer Employer file Decision (promo job changing) Internal rules global working contract 	plan ition action ness ting,	- Company	Clare, easy to read, complete
Initial activity: Entrance da	ta analysis				Final activity: Tra awareness and sat	aining ej tisfaction	fficiency evalu n	uation, employee
Facilities / Equipments	Who supplies	Req	uests"	" Train	ing and courses	Wh	o supplies	Requests
- PC	IT office	Reliable performa	nce	Trained p specialis	personal, ed courses	Manag	gement	Training courses

Figure 4. Material resources management

Objectives: - Training efficiency, employee awareness	Indicators: - no. of (mark well + very good) / no. total marks > 0,8 - costs / employee / total amount allocate - recrutement time of new employees (internal or external) - personal training costs/ allocate amount / year / department - employee fluctuations (max. 1,5%)
Measuring and control: Training efficiency analysis / annual; internal audit	

Figure 4 (continuation). Material resources management

SR EN ISO 9001:2001 Carti tehnice	Who s ASRO	supplies	Requests Last edition	Proc Instr	edures, ructions	Who supp Mechanical d	ep. Last revision
PROCESS ENTRANC	ΈS				PROCESS RESU	JLTS	
Entrances	Suppliers	Request	s		Results	Clients	s Requests
<i>materials</i> : - factory machines - auxiliary machines - machines, buildings, manufacturing spaces	Different companies Company	Reliable Working environme conformin with produ- requests	ent lg uct Ma res mana	aterial ource agement	- Monthly and yearly plan for revisions - Revision and reparation documents	Production sectors	n Complete, real, easy to read
<i>information:</i> - STAS - technical books	ASRO Special suppliers	Last editions					
Initial activity: Plannin	g revisions and	l reparation	is 🖉		Final activity: <i>R</i> e	ealisation of p	olaned activities
Facilities / Equipment	Who sup	plies	Requests	Training and knowledge	Who sup	plies	Requests
-PC -production machines	IT office Managemen	Pe nt Re	rformances liable	SMI raining	Managem	nent Train	ning courses
Objectives: Maintaining	g infrastructure	s conformir	g with product reque	sts Indicators: - Terms for revi	ision and reparati	ons	
Measuring and control Internal audit	:			-			

Figure 5. Material resources management (variant)

Process owner	Management



Figure 6. Continually improvement

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Process owner: Product Manager



Figure 7. Orientation to the client

Process owner: Marketing - Sales Manager



Figure 8. Relationship with the client

Figure 9. Project and development

0								
Standards	Who supplie	es Reque	ts	Pro	ocedures.	Who	supplies	Requests
SR EN ISO 9001-2001	ASRO	Last edition		Instructions		Marketi	no den	Last revision
Technical analifications	Sumplians	Last cultion		1113	u ucuvns	Markeu	ing dep.	Last ievision
rechnical specifications	Suppliers							
PROCESS ENTRANCES			N		PROCESS RE	SULTS		
Entrances	Suppliers	Requests	N		Results		Clients	Requests
materials:	IT office	Reliable	N		- Raw materials		Department	s Conforming
- IT support			N				· ·	with technical
information:		Real easy to			- NIR - no of entra	nces		specifications
offers	Suppliers	read			- NIK- IIO. OF CHU?	mees	Decduction	Complete
- otters	Suppliers	read					Production	Complete
- specifications			Logie	stic				
 supply sheet 	Departments		X.) –					
 accepted suppliers 	Logistic			X /'				
- suppliers category	Manager		A	X				
sheets	0							
- security sheet for				$\overline{}$				
- security sneet for								
dangerous substances		l l l		N N				
 environment aspects 		/		N N				
generated by products								
Initial activity: Evaluation	and selection of	unnliers		N	Final activity Ra	w materi	als supply co	nforming with
An alugia	i ana selection of s	suppliers		Ň	r mar activity . Ru	w maacra	us suppry co	ijornung wun
Analysis				Ň	specifications			
Facilities / Equipment	Who supplie	s Reque	ts /	Thaining	g and knowledge	Who	supplies	Requests
- PC	Management	Reliable		Trained pe	ersonal in	Manage	ement	Special studies
- faxes, telephones	-			economics	, commercial	-		Internal courses
· 1				domains. S	SMI training	BMC		
Objectives				Indicators:	p			
Evoluated and calcoted av	pplion			auppliars par	contaco			
- Evaluated and selected suppliers				- suppliers per	centage		1	
 Raw materials conforming with specifications 				- un-conformi	ng product / total s	supplied p	products / sup	pher/year
 Basic principle "first in- f 	irst out"			 logistic reali 	sed term / planed	term / suj	pplier / year	
Measuring and control:								
Monitoring and measuring	product, internal a	udit						
moning and measuring	product, mernur u							

Process owner: Logistic Manager

Figure 10. Logistic

Process owner: Product Manager

Figure 11. Production

Objectives: - Reducing, even eliminating un-conforming products - Realisation of conforming products - Client satisfaction - Enough resources for production	Indicators: - re-processed products quantity - no. of un-conforming products / month - no. reclamations / client / once at three months - type of problems and time to solve it / monthly - realised / planned production / day / month - productivity / monthly
Measuring and control: Internal audit, Laboratory Quality, Inspection Quality	

Figure 11. Production (continuation)

Process owner	Logistic Manager

upplies Requests partment Last revision
partment Last revision
ts Requests
uses Products
ors conforming with
specification
specification
sts Requests
Training courses
framing courses
month
nth

Figure 12. Sales

Process owner: Quality and Environment Representative

Figure 13. Environmental aspects

Process owner: Quality Environment Management representative

Standards SR EN ISO 9001: 2001 SR EN ISO 14001: 1997	Who supplies ASRO	Requests Last edition		Procedures, Instructions	Who supplies BMC	Requests Last revision
PROCESS ENTRANCES		⊐\		PROCESS RESUL	TS	
Entrances	Suppliers	Requests		Results	Clien	ts Requests
<i>materials</i> : - IT support	IT office Re	liable	1	 Critical control por Potential pollution 	int list Compar sheet	ny Complete information,
<i>information:</i> - environment aspects sheet - wastes plan - working instructions - environment legislation	IQ-LQ and con	sy to find d read, nplete, real	ining for rrgency ations and wer ability	 Preventing polluti accident program Prevention polluti program 	on by on	last revision
Initial activity: Identifying p emergency situation	ootential accidents an	d		Final activity: Imp pollution by accident	lementation of prog nt	rams to prevent
			75			
Facilities / Equipments	Who supplies	Requests	Trainin	ig and knowledge	Who supplies	Requests
 PC laboratory equipment chemical substances 	IT office Logistic	Reliable, performance	nternal a trainings	and external	Management, BMC	Training courses

Objectives: - Reducing the impact to the environment in emergency situations	Indicators: - measured / requested values
Measuring and control:	
Internal audit	
Data analysis	

Figure 14. Training for emergency situations and answer ability

Figure 15. Documents and registration control

Process	owner.	Organication	

Figure 16. Communication

Figure 17. Monitoring and measuring control

Process owner: Marketing Manager

Standards	Who supplies Requests		1	Procedures,	Who supplies	Requests
SR EN ISO 9001:2001	ASRO	Last edition	Instructions		Marketing dep.	Last revision
PROCESS ENTRANCE:	S			PROCESS R	ESULTS	
Entrances	Suppliers	Requests	N	Results	Clients	Requests
<i>materials</i> : - IT support	IT office R	eliable		- Client satisfactio evaluation sheet	n Product Man Marketing	ager Complete, real, easy to read
<i>information:</i> - market research about client's requests and expecting Client satisfaction evaluation questionnaire	Marketing K	eal, easy to ead and find	Client satisfactio		Manager	
Initial activity: Entrance in	nformation analysis		1	Final activity: Es	tablishing client sati	sfaction level
		/	7 1			
Facilities / Equipments	Who supplies	Requests		Training and knowledge	Who supplies	Requests
 PC faxes, writing materials 	IT office Top Management	Reliable	4	Professional training, SMI	Top Management, BMC	Training courses
Objectives: - Maximum percentage for	all clients		In - c - n - n - n	dicators: alculating satisfaction percent number of new clients number of prolongate contracts number of lost contracts	age s	
Measuring and control: Internal audit Data analysis						

Figure 18. Client satisfaction

Management								
Standards	Who sup	plies	Requests		Procedures,	Who suppli	es Reques	sts
SR EN ISO 9001:2001 SR EN ISO 14001:1997	ASKO		Last edition		Instructions	вмс	Last revisi	on
PROCESS ENTRANCE	S		I \		PROCESS RESULT	S		
Entrances	Suppliers	Reque	sts		Results	Clients	Requests]
<i>materials</i> : - IT support	IT office	Reliabl	e	1	-Audit reports AR -Correction action	Departments	Clear, easy to read	1
<i>information:</i> - SMI documents -results for the last audits	BMC, organisation	Easy to read, la revisior	st INTERN AUDIT		reports -CAR		documents,	
Initial activity: Audit pla	ns, questionnaire	es	⊐∕⊂	X	Final activity: Audits	5		
Facilities / Equipment	Who sup	plies	Requests	TÌ	ining and knowledge	Who suppl	ies Requ	iests
-PC - writing products	IT office Managemen	ıt	Performances	Trai aud	ined personal as internal itor	Management	Training c	ourses
Objectives: Implementation	on, function and	improver	nent of the system	Indicat -Superv -Planne -Audit	t ors: /ising and certifying aud /d / realised audits efficiency (no. of correc	lit report tive actions result	ted)	
Measuring and control: Data analysis								

Figure 19. Internal audit

IQ/LQ								
StandardsWhoSR EN ISO 9000ASROSR EN ISO 14000		ASRO	ipplies	Last edition	tequests Procedures, dition Instructions		Who supplie IQ-LQ	s Requests Last revision
PROCESS ENTH	RANCES				PRO	CESS RE	SULTS	
Entrances	Sup	pliers	Requests		ŀ	Results	Clients	Requests
<i>materials</i> : - DMM - chemical substances	Differen compani	it ies	Reliable	Monitori	- Qua	lity Plan	Production	Complete, real, easy to read
<i>information:</i> - measuring methods - product request - legal request - technical literature	IQ-LQ Producti Logistic. Low Off Manager	ion, fice ment	Easy to read, clear, complete	the prod	suring O			
Initial activities: International technical specification of the second specification	Elaboratin tions, ana	ng Quality P ulysis method	lan, ls		Final analy	activities sis	: Monitoring and n	neasuring
Facilities / Equi - laboratory equipi - chemical substat -PC	pment ment nces	Who sup Logistic IT Office	plies In Pe	Requests term rformances	Training and know Trained workers professional, SMI	vledge	Who supplies Head of Laboratory Quality Inspection BMC –Quality Management	Requests Internal training
Objectives: - Assuring that rec	uests are i	realised			Indicators: - Un-co - realiz	onforming ed / reque	products / month ested value / month	
Measuring and co Internal audit: Dat	ontrol: a analysis							

Figure 20. Monitoring and measuring the product

Process owner: Heads of Departments

Figure 21. Monitoring and measuring the product (variant)

Objectives: - Ensuring that un-conforming product is identified and kept isolated to prevent it's unintended using and delivery	Indicators: - no. of solved un-conformities / no. of total un-conformities / two times a year - no. compliances and suggestions / client/ product, process, system / two times a year
Measuring and control: Internal audit; Data analysis; Monitoring and measuring the product	

Figure 21. Monitoring and measuring the product (variant) (continuation)

Trocess owner. Heads of	Departments					
Standards SR EN ISO 9001:2001	Who suppli ASRO	les Requests Last edition		Procedures, Instructions	Who supplies BMC	Requests Last revision
SR EN ISO 14001:1997 PROCESS ENTRANCE	s		┥┕	PROCESS R	RESULTS	
Entrances	Suppliers	Requests		Results	Clients	Requests
materials: - un-conforming products	departments	Reliable		- RNC, completed	Reception: - Supplier	-Documents complete,
<i>information:</i> - product specification - technical data sheet - working instructions - company standards - procedures -HACCP plan	Laboratory Quality Inspection Departments	Real, complete, understandable	Un- conforming product control	CCP report - Marked and isolated un- conforming product	 Production Fabrication: Logistic (rebut) Production (acceptance derogation or reprocessin Final product: Logistic (rebut) Sales (acceptance by derogation) Production (reprocessing) 	g) understanding, easy to read - Special places to store the products
Initial activity: Identifican	tion of un-conform	ing products	$\angle \Delta$	Ainal activity actions	y: Implementation and che	cking for corrective
Facilities / Equipments -laboratory equipment - chemical substances for analysis - PC	Who suppli Logistic IT office	es Requests Reliable Conforming wi expire date	h Trài Spec Sh SMI	ining and knowle by studies hing professional tranging	edge Who supplies Head of IQ-LQ BMC	Requests Internal training
Objectives: - Ensuring that un-conform to prevent it's unintended u	ning product is iden using and delivery	ntified and kept isolate	Indicators: d - no. of solve - no. complian	d unconformities/r nces and suggestion	no. of total unconformities/ ns/client/product, process,	'two times a year system/two times a ye
Measuring and control: Internal audit; Data analys	is; Monitoring and	measuring the product				

Process owner: Heads of Departments

Figure 22. Un-conforming product control

Figure 23. Data analysis

As observed in the synthetic figures presented before (Figure 1 to 23), the implementation of ISO standards requires technical comities comprising experts from the industrial, technical and business sectors which have asked for the standards, and which subsequently put them to use. These experts may be joined by others with relevant knowledge, such as representatives of government agencies, testing laboratories, consumer associations, environmentalists, academic circles and so on.

The experts participate as national delegations, chosen by the ISO national member institute for the country concerned. These delegations are required to represent not just the views of the organizations in which their participating experts work, but of other stakeholders too.

According to ISO rules, the member institute is expected to take account of the views of the range of parties interested in the standard under development and to present a consolidated, national consensus position to the technical committee.

CONCLUSIONS

The process map and process diagrams developed using ISO are useful to industrial and business organisations of all types, to governments and other regulatory bodies, to trade officials, to conformity assessment professionals, to suppliers of products and services in both public and private sectors.

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