Energy and Sustainability Topics – Environmental management systems in plastics processing

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Part 1: Clean business = good business

Environmental Management Systems (EMS) are rapidly becoming an important issue in sustainability and particularly in the plastics industry. Some companies are under pressure from their customers and society whilst others recognise the environmental impacts of their business and want to minimise these. Perhaps the most important reason is that companies who have implemented an effective EMS have often not only improved their environmental and sustainability performance but have also achieved substantial cost reductions. An EMS with strong emphasis on minimising waste and continual improvement will help a company to reduce costs.

A good EMS is a practical management tool to:

- Identify, assess and manage the environmental consequences of operations.
- Reduce waste and operating costs.
- Gain a competitive advantage.
- Establish and show a system for continual environmental improvement.
- Demonstrate legal compliance.
- Improve the public image.

1. Waste minimisation and EMS

An EMS focused on reducing physical waste and emissions will not only improve sustainability but will also give cost reductions from reduced scrap, reduced rework and reduced energy use. The average UK plastics processing first-time yield rate is just under 95%, this represents an average first-pass rejection rate of over 5%. This rate increases operating costs and reduces capacity from the lost opportunity to produce saleable product.

Eliminating or reducing waste gives environmental benefits by reducing the use and waste of resources and also reduces costs.

2. The benefits of an EMS

Management and financial

- Structured approach to environmental issues.
- Keeping ahead of environmental legislation.
- Identification and reduction of waste.
- Increased profits.
- Reduced risk of fines.
- Reduced insurance premiums.

Productivity

- Improved process control.
- Reduced use of raw materials and consumables.
- Reduced waste and rejects.

Sales and marketing

- Improved products.

Public relations

- Improved community relations and public image.

Personnel and training

- Improved working environment.
- Reduced potential for environmental incidents.
- Improved employee motivation.

3. EMS basics

An effective EMS will include:

- An assessment of the environmental aspects and impacts of the company's activities, products, processes and services.
- An environmental policy.
- An environmental improvement programme with objectives and targets.
- Identified roles and responsibilities for all employees.
- A training and awareness programme.
- Written procedures to control activities with a significant environmental impact.
- A control system for 'documented information'.
- A programme of regular auditing.
- A formal review process for the EMS.
- **Tip:** Many of these will already be in place as a result of ISO 9001.

4. Approaches to EMS

An EMS can be developed to comply with the ISO 14001 model but it is also possible to follow the EU Eco-Management and Audit Scheme (EMAS) or even to develop an in-house EMS. Companies using the first two approaches can obtain formal certification to ISO 14001 or verification to EMAS. EMAS is slightly more demanding than ISO 14001 but does offer more benefits.

- **Tip:** Look at EMAS as an alternative to ISO 14001. The publication of the 2017 and 2019 EMAS Annexes means that EMAS now includes all the requirements of ISO 14001 and transition has been made much easier.
- **Tip:** EMAS uses the term 'verification' but ISO 14001 uses the term 'certification'. They are effectively the same thing.

It is not necessary to get external recognition to obtain many of the benefits but the formal approach increases the commitment to continual improvement and to identifying opportunities for improvement and cost savings. External recognition increases the credibility of an EMS and provided the EMS has been systematically and properly implemented then certification does not require much more effort, although it does increase the cost.

Certification and accreditation are not the same thing.

A company is certified, registered or approved by a 'Certified Body'. These will generally be 'for profit' companies and there will generally be many in each country.

A 'Certified Body' will be accredited to issue certification by the national 'Accreditation Body'. These will generally be national bodies and will be backed by the government. There will normally only be one 'Accreditation Body' in each country and they agree to accept each other's judgements and accreditations.

5. Key factors for success

Gain senior management commitment

Strong senior management commitment is essential for the successful implementation and operation of an EMS. The benefits and aims of the EMS should be explained to senior managers before starting the implementation process. Convincing senior managers will require a project plan and a detailed estimate of the potential costs and the potential cost savings from adopting an EMS.

Build on existing systems

There are many links between existing quality, health and safety and other Management Systems Standards (MSS) developed to meet the ISO Annex L structure. Using these links and processes from other MSS can reduce the effort needed to implement an EMS.

- **Tip:** It is environmentally good to re-use, so do it with procedures and processes that are common across the standards.
- **Tip:** There is no requirement to have separate systems or documents for common areas. If your systems meet one MSS then they will meet another.

6. Getting certified

To be ready for certification to ISO 14001, an EMS should have been fully operational for at least three months and at least one management review should have been conducted. For initial registration, participants need to have a fully operational EMS with an audit programme already in place and to produce an initial and validated Environmental Statement.

Many companies use the same certification body for their EMS as for their QMS. However, it is important to check that the auditor is also accredited for ISO 14001 certification.

- **Tip:** Check that the proposed auditor has relevant experience in the plastics industry.

Auditors use a range of methods for certification. Be sure to understand the different stages of the proposed process and what the auditor will be looking for at each stage. Ask the chosen auditor to run through the process of certification.

Before the auditor visits for the first time, hold a meeting to ensure everyone knows about the certification and what it will entail.

An ‘Initial Review’ (see Part 2) will help to gather the data that will give a ‘snapshot’ of the environmental status. Regular reviews will help to quantify the savings made and maintain the momentum.

Formal certification of an EMS is a significant milestone but not the end of the journey. Every EMS needs continued attention to deliver further improvement and savings. This must be appreciated by senior managers – otherwise the initial enthusiasm for the EMS may decline after certification is achieved.

7. What to do next

Implementing an EMS with a focus on waste minimisation and continual improvement will reduce costs and improve environmental performance. The basic practical steps in implementing an EMS are:

- Understand the main elements of an EMS and become familiar with the standard’s requirements.
- Appoint someone to manage implementation and operation.
- Develop an environmental policy.
- Identify the company’s environmental aspects, evaluate their significance and draw up a register of significant aspects.
- Identify legislative requirements and draw up a Register of Legislation.

- Set objectives and targets.
- Assign responsibility.
- Develop employee awareness and conduct training.
- Prepare procedures to deliver operational and documented information control.
- Regularly monitor and measure significant aspects, e.g., waste, water and energy.
- Develop an internal audit mechanism and timetable.
- Review progress and, if necessary, revise the policy, objectives and targets.

8. Find out more

Some of old Envirowise publications are very useful in terms of implementing an EMS. These are dated, i.e., they were written before ISO 14001 was integrated with other management systems, but contain valuable advice. Copies are available from the 'Archived Publications' section of the Tangram Technology web site:

- GG 125 – Waste Minimisation Pays: Five business reasons for reducing waste.
- GG 251 – Environmental Management Systems for the plastics industry.
- GG 277 – Finding and reducing waste in plastics processing.

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Part 2: Starting out

1. Implementation planning

Planning and organisation are vital to successfully implementing an EMS. It is important to involve a range of people in implementation, particularly when the EMS overlaps with their normal roles or functions, as it will normally do.

A formal implementation project team will help to keep the EMS on track and identify and remove obstacles to progress. The team should include representatives from:

- Top management.
- Production.
- Quality.
- Environmental/health and safety.

Representatives from the procurement, finance and personnel departments may also need to be involved from time to time.

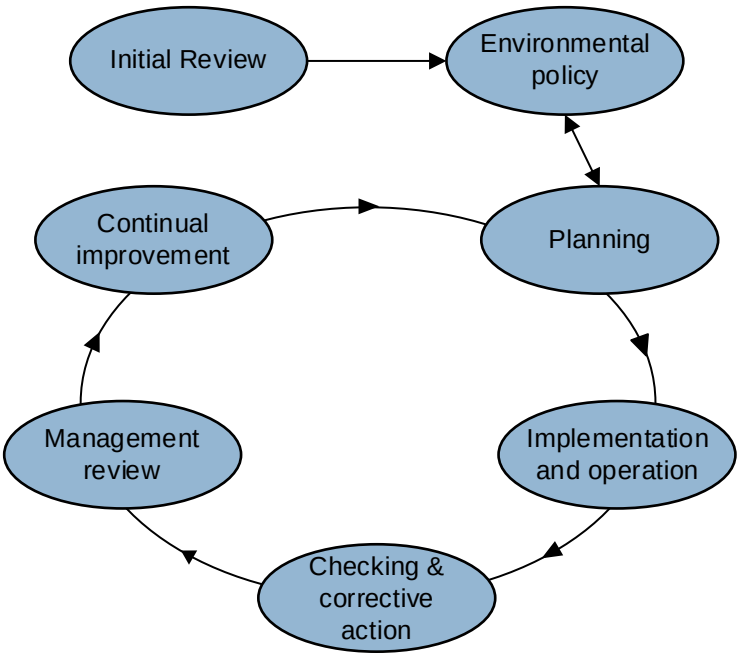
- **Tip:** An EMS 'champion' should be made responsible for implementing the EMS and coordinating the efforts of the implementation team.

The team should agree a common and collaborative approach and share out the work. To ensure progress is made, it is essential that team members be allocated enough time and resources.

The team should meet regularly – perhaps fortnightly – with adequate administrative support to ensure minutes are taken and, most importantly, action plans are updated.

To keep the whole project on track, the EMS champion should review any action plans weekly. The EMS champion may also find it useful to set up separate teams to tackle specific issues such as energy efficiency, water use, waste minimisation and packaging use. These teams should always involve employees from all levels of the business.

- **Tip:** Use a top manager to steer the team. This will facilitate progress and give good communication with top management.



The EMS Improvement Cycle

2. Timescale for implementation

Implementing an EMS normally takes around 12-18 months but can be shorter if the company already has a similar MSS, e.g., ISO 9001, because of the ability to re-use procedures and documents. Where customers are demanding an EMS, they will often accept a reasonable timescale provided it is accompanied by a good, realistic implementation plan.

3. Initial review of operations

An Initial Review will help to assess how the company operations affect the environment and will provide benchmark data to help achieve continual improvement.

- **Tip:** ISO 14001 does not require a formal Initial Review, but it does require an assessment of environmental issues and impacts whereas EMAS requires a formal Initial Review.

Carrying out an Initial Review will help to:

- Gain an overview of the company attitude to waste and the environment.
- Prepare/revise the environmental policy (see below).
- Identify the environmental aspects of activities and their impacts.
- Assess relevant legislation.
- Identify opportunities for improvement.
- Set objectives and targets.

The main tasks in an Initial Review are data gathering and analysis. Checklists and worksheets provided in GG251 (see Part 1) can be used to identify and locate the documents needed. Information will need to be collected about:

- The site and its environmental history.
- Raw material consumption and storage.
- Utility consumption and costs.
- Solid waste amounts and management.
- Emissions to atmosphere.

4. The environmental policy

After completing an Initial Review, it is possible to write an effective environmental policy. The policy must be reasonable, practical and match the business needs. The policy may commit the company to different management approaches and both customers and members of the public may want to see it. It should be reviewed regularly and, if necessary, revised to take account of developments in the EMS.

The policy should refer to the aims for significant environmental aspects, refer to continual improvement (through objectives and targets) and compliance with legislation. It could also refer to:

- Training and awareness for employees.
- Working with the supply chain.
- Planning for emergencies.
- Relations with neighbours and regulators.
- Sustainability in the broader context.

5. Objectives and targets

Setting objectives and realistic targets is the best way to achieve continual improvement and maximum savings from an EMS.

Objectives

These should aim to give improvements in:

- The significant environmental aspects.
- The environmental policy.
- Technical options.
- Financial, operational and other business requirements.

Targets

Targets should always be SMART (Specific, Measurable, Achievable, Relevant and Time-limited) and can be one of three types:

- **Measurement –** improvement targets cannot be set without base-line measurements.
- **Improvement –** measuring an aspect and then identifying the scope for improvement allows improvement targets to be set (quantify the cost/benefits for senior managers).
- **Control –** after improvements have been made, control targets can be used to 'hold the gains'.

Owners should always be identified for targets to ensure that the workload is shared out, that individuals are clearly responsible for different issues and that they know where to focus their efforts.

Note: Objectives and targets must be set for continual improvement.

Tip: Set a target for carbon footprint reduction as an overall objective but make it SMART).

Checklist:

- Written objectives and targets for each relevant function and level for the company.
- A written procedure for setting objectives and targets.
- Records of previous objectives and targets and a summary report on performance (also needed for the Management Review).

6. Legal requirements and EMS

Compliance with the law is a key part of any EMS and appropriate controls are needed to be sure of full compliance. It is necessary to:

- Identify a source of guidance to all environmental legislation.
- Identify the legislation relevant to the site and operations.
- Get copies of the Acts, Regulations or Codes of Practice as necessary.
- List the appropriate legislation and how it applies to the site (the compliance obligations).

The method of identifying the legal requirements should be part of a procedure within the EMS. This procedure should require at least an annual review/update of compliance obligations and the review should be linked to an annual assessment of compliance. When the compliance obligations are updated, key changes should be summarised and relevant employees should be notified. If you are not sure which legislation, regulations and codes of practice apply to your site, you should seek specialist advice.

Checklist:

- A written procedure to identify legal and other requirements applicable to the site's environment-

related activities.

- A procedure that ensures managers are aware of forthcoming legislation that may affect the company
- A ‘Register of Legislation’
- All permits, authorisations, etc. required under current legislation
- Proof of updating of the Register of Legislation.

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Part 3: Managing interactions with the environment

1. What matters?

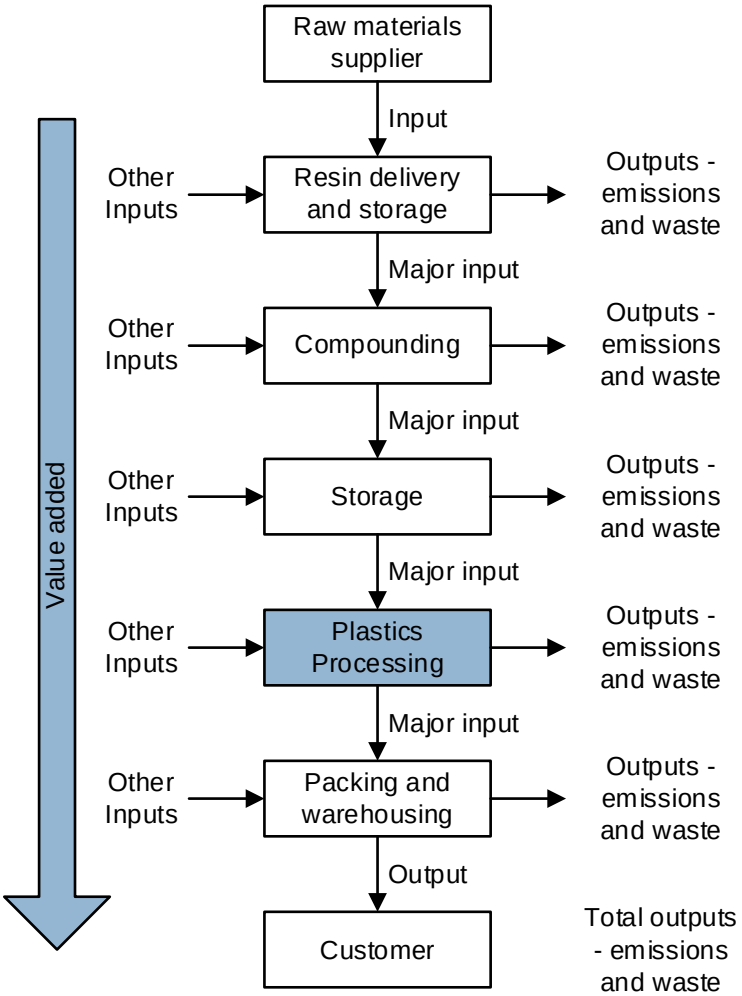
One of the most difficult things in implementing an EMS to ISO 14001 or EMAS is understanding the concepts of ‘aspects’ and ‘impacts’ and how these work.

Identifying and understanding interactions with the environment is generally considered in terms of ‘aspects’ and ‘impacts’. Aspects are the cause of an environmental ‘impact’ or effect. Environmental aspects may also include measures you have already taken to prevent or reduce pollution.

Note: Planning for aspects and impacts and compliance obligations is required and all documented information should be retained.

2. The process matters

The easiest way to start to assess aspects and impacts is to produce a process flow chart for each of the main processes. Process flow charts should be created for each activity on the site, e.g., manufacturing, utilities, stores, maintenance and office processes. It is important to consider all emissions to air, water, and land (as waste or through spills) in the initial process flow charts – however small they may be.



A general process flow chart for plastics processing

Tip: If you have created process maps for ISO 9001 (or any of the many purposes for which they are vital) these can be re-used as the basis for the ISO 14001 process flow charts.

Tip: An aspect may later be discounted as very low risk but it should be in the plans to show that it has been considered.

Tip: Do not focus only on normal operations, i.e., also consider what happens under abnormal situations such as start-ups, shutdowns and cleaning, as well as the potential for incidents and accidents.

Remember to include:

- Non-core processes.
- Refrigerants in cooling and air conditioning.
- PCBs in electrical transformers.

Normally these will not escape into the environment, but the EMS should have procedures for dealing with them during maintenance and final disposal.

Companies often find that compiling a list of environmental aspects and impacts and assessing their significance is the most difficult stage of implementing an EMS.

3. Identifying aspects

From the process flow charts, decide which inputs and outputs may interact with the environment. These are the environmental aspects.

Tip: Do not focus only on those aspects which are covered by legislation. It may not be covered by legislation but it may be significant in impact terms.

4. Identifying impacts

Impacts cannot be directly controlled – they are generated by the previously identified aspects. An aspect can generate more than one impact and many aspects have indirect impacts. Electricity use (an aspect) has three indirect impacts, i.e., potential climate change from CO_2 emissions, air pollution from acid gas emissions and resource depletion through fossil fuel use. Think beyond the obvious at the initial stages.

5. Assessing significance

Having identified the aspects and impacts, it is necessary to assess which of the aspects are ‘significant’ to the organisation so that these can be managed by the EMS. The Initial Review should have revealed which activities are covered by legislation and/or have a high potential cost. Improvements in these activities will have a high beneficial environmental effect and can significantly reduce costs.

Assessing significance through a formal procedure makes effective use of limited resources and avoids having to try to deal with all the potential impacts (including the insignificant ones).

ISO 14001 requires planning to address risks and opportunities of significant aspects and impacts. However, there is no requirement for a formal risk management process and the standard does not specify a method for assessing or quantifying these risks and opportunities, i.e., the company can select the method. Whichever method is chosen to assess significance, it should be an approach that is appropriate to the company. The keys to success are:

- A consistent approach that allows each issue to be clearly treated in the same way.
- An ability to demonstrate and justify the methodology used.

- A full systematic record for future reference of decisions taken.
- The use of criteria that provide a rational basis for the rest of the EMS.

Risk assessment method

One of the easiest methods is risk assessment through a formal FMEA method. This approach uses proven risk assessment methods to predict the likelihood and severity of outcomes or events. This is similar to other risk assessment methods used for quality and health and safety management. In all these methods, ratings of severity, likelihood and detection are individually assessed and then combined to produce an overall assessment of the risk.

A risk factor rating is assigned to each potential impact after considering the following:

- Hazardous properties.
- Size.
- Frequency or likelihood of occurrence.
- Presence of sensitive environmental receptors, e.g., people, a watercourse and/or site of special scientific interest.
- Presence or absence of environmental controls, e.g., techniques designed to control or prevent the impact.

For each impact, decide the degree of severity (minor, moderate, major) and how likely it is to occur (unlikely, likely, very likely). A total risk assessment, the Risk Priority Number (RPN), is obtained by combining the severity of the consequences with the likelihood of occurrence for each impact. A numerical rating is given to each, with a higher RPN indicating a higher risk of adverse impact.

What is significant?

After assessing significance, an impact is considered significant if the score is above an internally set threshold value. It is up to the company to set the RPN threshold value over which impacts are considered significant but the reasons for the decision should be recorded.

6. Recording decisions

The reasons for all decisions should be recorded in a systematic manner for future reference and examination by auditors.

Procedure for evaluating significance

The procedure and output used to identify aspects and assess them for significance must be recorded and produce consistent results for each site.

Risks and opportunities

The collection of lists of environmental aspects, their impacts and an evaluation of their significance makes up the ‘documented information’ on risks and opportunities. This should give details of the company’s environmental aspects, together with an analysis of their impacts. It should indicate whether an aspect is considered significant and how significant environmental aspects are linked to the EMS.

The documented information should be regularly reviewed and updated to take account of any changes in legislation or operations.

Remember to assess new projects according to the chosen method and to link the evaluation procedure to the capital expenditure application and authorisation process.

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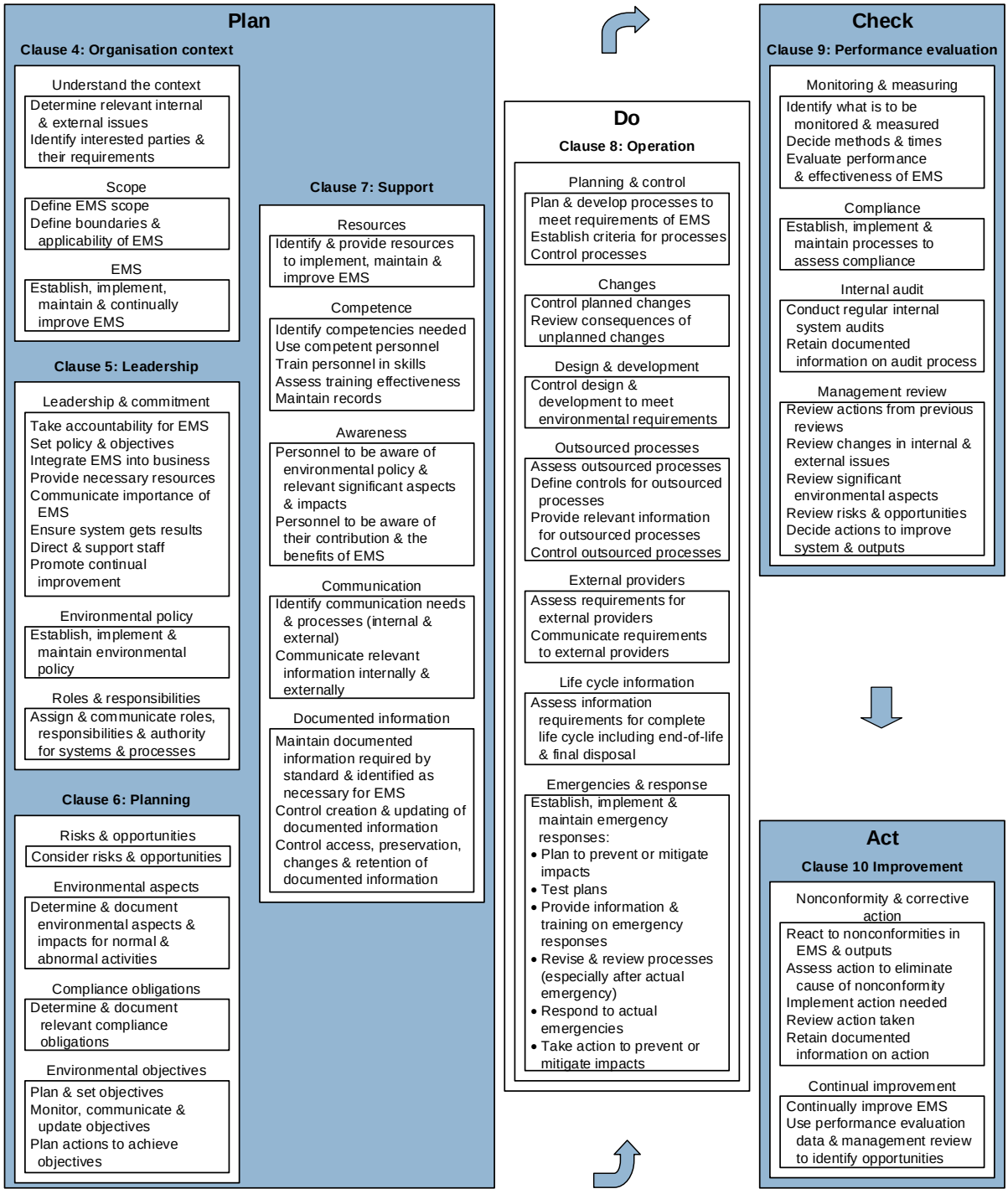
Part 4: The outline of ISO 14001

1. It is not that difficult

An overview of ISO 14001 is shown below and the requirements are relatively straightforward for anybody who has already dealt with ISO 9001:



An overview of the ISO 14001 requirements

2. Documented information

Certain information is required to prove conformance with the standard and this is referred to in the standard as a requirement for 'documented information'. Some of these specific requirements and a list of 'good practice' information are given below. If you have all of this information then proving compliance is not difficult, getting the information may well be.

What you will need for ISO 14001:

- Clause 4 – Context of the organisation

  An assessment of the internal and external issues and records of the scope and boundaries of the EMS.

- Clause 5 – Leadership

  Demonstration of leadership and commitment to the EMS.

  An environmental policy that is communicated to the staff and available to interested parties.

- Clause 6 – Planning

  An assessment of the risks and opportunities to the company.

  An assessment of the environmental aspects and impacts and their significance.

  A compliance assessment process for environmental aspects.

  Plans to reduce aspects, improve compliance and reduce risks.

- Clause 7 – Support

  A process to assess competencies, deliver training to meet competence needs and assess effectiveness.

  Processes for internal and external communications.

  Records of internal and external communications.

  A process for control of documented information.

- Clause 8 – Operation

  Planning and processes to control the environmental impact at all stages of the product life cycle.

  Planning and processes for emergency responses to reduce environmental impacts of all situations where their absence could lead to adverse impacts.

  Proof of tests of emergency response processes.

- Clause 9 – Performance evaluation

  Processes to measure significant environmental aspects such as raw material use, solid waste, water use, releases to water/sewer, emissions to air, energy use, etc.

  Assessment of the company's environmental performance.

  An audit process, programme and audit reports.

  A management review process including management review agenda and minutes of management review meetings.

- Clause 10 – Improvement

  Processes for non-conformance and corrective/preventative action.

  Recording of non-conformances and corrective/preventative action, i.e., reports on follow-up actions.

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Part 5: The basic EMS system

1. Management programme

This is a written programme of work stating when and how the objectives will be achieved, and who is responsible for achieving them. This helps effective EMS implementation and ensures a systematic approach to waste minimisation and optimum benefits. The Management Programme is not a detailed project plan, but should include deadlines for completing the tasks associated with the objectives and targets.

One key to success is to set intermediate deadlines for each objective. This enables objectives to be completed in small, manageable parts and defines clearly 'what', 'who' and 'when'. Give ownership of each target to a responsible individual and set 'milestones' to allow the objectives, the targets and the Programme to be audited.

Checklist:

- A written programme of work outlining when and how the objectives and targets of the EMS will be achieved.

Procedures should record the way you do things as simply as possible.

2. Organisation and structure

Senior management commitment and correctly delegated power and responsibility are vital for the success of the EMS.

- Ensure a senior manager has responsibility for the system at Board level.
- Formally define the roles of the EMS champion and the implementation team.
- Include key roles and responsibilities in the job descriptions of relevant employees.

Checklist:

- An organisation chart with asterisks highlighting the members of the EMS team.
- Current job descriptions.

3. Training

Training is an essential requirement for the success of an EMS. It should raise general awareness of environmental issues and also provide specific technical skills.

When developing the EMS, a training needs assessment matrix should be produced. This will include the relevant job functions and the different types of technical knowledge required to operate the EMS.

- Identify the issues and procedures where employees need training and the key roles that need training.
- Ensure that all employees (including new recruits) receive a basic training in environmental awareness, waste minimisation and the elements of the EMS.

It is important to provide proof of training and to ensure that if a key training session is missed then this is rescheduled for a later date. Many Quality Management Systems (QMS) also include procedures for recording training needs and attendance.

To maximise cost-effectiveness and minimise inconvenience, training sessions can be run between shifts to reach a larger audience.

Note: It is not sufficient to provide training just once. Refresher training and further specialist training may be necessary for the system to mature and provide good results.

Checklist:

- A formal, documented procedure to assess training needs.
- A written plan to deliver the training.
- Records of training materials.
- Signed training attendance forms.

4. Communication

Communicating the reasons for the EMS, the role of individuals and the progress being made will help to achieve ownership of the EMS by all employees and maintain the momentum for continuous improvement. Tell the outside world what is being done and what has been achieved to improve public and customer perception and show that you care for the environment.

Internal communications

The procedure should specify the methods, e.g., newsletters and posters and, the approximate frequency of communication. Information of relevance to the EMS – current performance, successes, incidents, new legislation, site improvements, awards – should be communicated, and records kept to prove the communications took place.

External communications

The procedure is to ensure that:

- Communications to and from external interested parties are received, documented and responded to by the correct person.
- Records of the content of communications are held.

After progress with the EMS, the annual performance data could form the basis for either an internal or an external report.

Checklist:

- Procedures for internal and external communications.
- Records of internal communications.
- An external communications log.

5. Management manual

The Management Manual acts as a guide to the EMS procedures and documents and describes the entire system.

The Management Manual should include:

- A brief history of the company.
- The environmental policy.
- A description of how the EMS works.
- A list of EMS procedures.
- Descriptions of key management responsibilities and an organisation chart.

The format of the Management Manual can follow the format of any existing quality management manual. It is possible to produce a joint Quality, Environmental and Health and Safety Manuals and to refer to it as the ‘Company Manual’.

Checklist:

- A collection of documents forming an Environmental Management Manual.
- A manual providing good links to all other parts of the system.

6. Document control

Document control for an EMS is similar to that in a QMS. There should already be a suitable document control procedure in your ISO 9000 system if you are certified.

Document control relies on:

- Systematic numbering of documents with a title, date and version number.
- Review, revision and approval procedures.
- Controlled withdrawal of obsolete documents and issue of new versions.

Checklist:

- A written procedure for document control.

7. Operational controls

Operational controls/procedures should be developed for all situations where their absence could lead to a deviation from the environmental policy. Keep procedures simple and use pictures and flow diagrams if possible.

Note: Simple notices can be regarded as procedures if they are controlled by the EMS.

Every procedure should have an 'owner', who is responsible for writing the procedure, writing future updates and ensuring that the procedure is used. Decentralised ownership of procedures will spread out the work when they need to be updated.

Existing procedures developed for a QMS may be amended for ISO 14001. These can include procedures for:

- Bulk deliveries.
- Management of resource consumption.
- Site waste management.
- Control of pollution abatement plant.
- Energy management.
- Planned preventative maintenance (PPM) and inspection.

Checklist:

- Procedures for all situations where their absence could lead to a deviation from the environmental policy.

Remember:

Say you do and then do what you say

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Part 6: Operating an EMS system

1. Emergency procedures

Use the existing emergency procedures to develop a procedure to deal with emergencies that:

- Identifies the environmental risks associated with the emergency.
- Makes a broad assessment of possible emergency situations.

Checklist:

- Written emergency procedures.
- Records/proof of tests of these procedures.

2. Monitoring and measurement

General principles of monitoring and measurement

ISO 14001 is not simply intended to monitor aspects and impacts or to provide a framework for emergency responses. It is intended to provide a framework for improving environmental performance and this needs monitoring and measuring.

The EMS should include processes for monitoring and measuring the critical factors for the significant aspects identified by the site. Obtaining reliable and effective data is the key to generating information that can be used for management action. Data collection and analysis is a vital tool in reducing resource use, minimising waste and improving sustainability.

Although ISO 14001 does not specify the frequency of monitoring and measuring it is unlikely that anything longer than annual measurement would be acceptable for significant aspects or impacts. More frequent measurement is often necessary to identify variations and opportunities to reduce environmental impacts and costs. The sooner corrective action is taken, the less impacts are created and the more cost savings will be achieved. The measurements can be used in the management review, displayed internally to report success and used in a full Sustainability Report).

Tip: The sustainability report can also link to social responsibility issues.

Typical parameters that could be measured include:

- Production levels.
- Waste generated.
- Water use.
- Energy use.
- Emissions to air.

Waste and utility data should always be related to a measure of production, e.g., tonnes of waste per tonne of product or tonnes of waste per number of units. Some data will be affected by a ‘base load’ and may need more sophisticated data analysis.

Calibration

A procedure is needed for the calibration of monitoring and measurement equipment.

- **Tip:** Calibrate all measuring equipment.

Measuring to manage: If you don’t measure it then you can’t manage it.

3. Assessing legislative compliance

Assessment of legislative compliance should be performed at least annually, and always after updates to the Register of Legislation. For some issues, there may be a statutory requirement to supply compliance information to regulators more frequently.

Checklist:

- Procedures to measure raw material use, solid waste, water use, releases to water/sewer, emission to air, energy use, etc.
- Calibration procedures.
- A compliance assessment procedure.

4. Identifying and correcting problems

Non-conformances are system failures found during audits, inspections and day-to-day activities. They should be investigated and corrective action agreed. The same process should also be used to carry out preventative actions before things go wrong. Check any existing ISO 9000 quality procedures to see if an additional procedure is needed or simply changes to existing procedures.

Written records of non-conformances and agreed corrective/preventative actions must be kept by using a corrective action request form.

Checklist:

- Procedures for non-conformance, corrective action and preventative action.
- Forms to record non-conformances and corrective/preventative action.
- Reports on follow-up actions.

5. Keeping records

The records required for an EMS include:

- Aspects Register.
- Register of Legislation.
- Objectives and targets.
- Monitoring and measurement data.
- Operational data relevant to the EMS.
- Non-conformance and corrective action forms.
- Audit reports.

There are legal requirements for the retention of some environmental documents and, although not a legal requirement, some other documents should be held forever to maintain the property asset value.

Keeping records should be dealt with under an ISO 9000 QMS and existing quality procedures may only need simple changes to meet the ISO 14001 requirements.

Checklist:

- A record-keeping procedure.

6. Internal audits

Internal audits are a systematic inspection and comparison of actual operating methods with policies, procedures, work instructions, etc. Environmental auditing helps to maintain environmental awareness and a sense of responsibility among employees.

There are three ISO standards dealing with EMS auditing. These cover ‘General Principles’, ‘Audit Procedures’ and ‘Criteria for Auditors’ (ISO 10010 to ISO 14012 respectively). Check that existing ISO 9000 audit procedures meet the requirements of ISO 14001 – particularly with respect to auditing objectives/targets and compliance with legislation.

An audit should focus on the significant environmental aspects and compliance with legislation.

An audit should allow you to:

- Determine whether the EMS has been implemented and maintained correctly.
- Verify that the system is working and is effective.
- Identify weaknesses in the system and/or areas for improvement.
- Assess compliance with the requirements of the EMS itself.

The auditor should have no management responsibility for the procedure being audited and should have been trained in auditing and the essential aspects of the procedure.

Audit frequency should be linked to the significance of the environmental impacts and all procedures must be audited at least once a year. The audit programme should take account of areas/issues identified for particular attention by previous audits.

Auditing often works best if the auditor has a list of key questions to ask about the procedure – preferably with simple yes/no responses. These questions can also be part of the procedure.

All non-conformances and agreed corrective/preventative actions should be recorded in an Audit Report and followed up to check that corrective and preventative actions have been taken.

Checklist:

- A written audit procedure.
- An audit programme.
- Audit reports.

7. Management review

Management Review allows senior managers to consider the effectiveness of the EMS. The discussion and its conclusions should be minuted and agreed actions implemented.

The agenda for management meetings should allocate time to discuss:

- Progress in achieving objectives and targets.
- Compliance with legislation.
- Audit reports.
- Non-conformance action reports.
- New processes and any changes to known environmental issues.
- New legislation.
- New customer requirements.
- Need for any revisions to the environmental policy, objectives and targets.

Senior management should consider whether to report externally on progress in reducing the impact of environmental aspects.

Checklist:

- A Management Review procedure.
- A Management Review agenda.

- Minutes of Management Review meetings.

Auditing checks if you are 'doing things right'. The Management Review should also check if you are 'doing the right things'.