

## Appendix A1. Assessment guidelines for suppliers' environmental management capabilities (EMC)

Specific activities for environmental capability evaluation		Evaluation guideline		
		1 (Low)	2 (Medium)	3 (High)
<b>Internal EMC</b>	<b>Product-EMC</b>			
	1) Hazardous material management within the products	o None	o Limited consideration of hazardous material monitoring and elimination	o Complete elimination of the current and likely-to-be hazardous materials through continuous material monitoring practices
	2) Eco-adaptive product development	o None	o A few cases (intermittent occurrence) of eco-adaptive product development	o Eco-adaptive product development in major products; and/or frequent eco-adaptive product development
	3) Use of design for the environment (DFE)	o None	o Limited and/or less important consideration of simple criteria regarding environmental performance in the new product development process	o Complete integration of environmental performance evaluation and monitoring procedures into the new product development process
<b>Process-EMC</b>	1) Reduction of energy, water use and emission	o None	o Energy and emission reduction practices in a few operations	o Reduction at the source' practices embedded in every operation
	2) Mass balance management	o None	o Keeping and monitoring records of inputs and outputs in a few important operations	o Complete keeping and monitoring of input and output records of the operations
	3) Compliance with local and regional regulations	o No compliance	o Compliance in regular, stable conditions	o Complete compliance in any circumstances
<b>Organization-EMC</b>	1) Building an environmental management system (EMS)	o None to implement	o EMS implementation in some managerial processes, e.g. operations and new product development	o Completed implementation of an EMS throughout the whole organization
	2) Official staff or organization for environmental responsibility	o No staff nor department	o Staff and/or organization mainly focusing on a narrow range of environmental issues, such as pollution control in the operations	o Officially assigned environmental staff and/or department who actively deal with a wide range of environmental issues in a firm
	3) Environmental training and education	o None	o Intermittent training and education mainly focusing on a narrow range of environmental issue, such as pollution control	o Periodic training and education encompassing a wide range of environmental issues, such as local, regional and global issues
<b>External EMC</b>	<b>Supply chain-EMC</b>			
	1) Evaluation and monitoring of supply and supplier	o None	o Limited consideration of harm-free raw materials and parts; and/or less official evaluation	o Complete integration of evaluation of raw material and part's environmental performance into a formal procurement procedure
	2) Eco-adaptive logistics	o None	o A narrow range of environmental practices in logistics, such as delivery package reusing and recycling	o Complete consideration of environmental burden during logistics
<b>Relationship-EMC</b>	1) Sound relationship with local communities	o Intermittent conflicts with communities	o Conflict management when dealing with the aftermath of claims	o Reputation building through pre-cautionary approach
	2) Voluntary environmental protection programs	o None	o Participation in regional and local environmental initiatives, such as the 'One Company One Clean River' campaign in Korea	o Active participation and/or leadership in environmental protection initiatives
	3) Disclosure of environmental information	o None	o Irregular disclosure of a limited range of environmental information, such as environmental data of the operations	o Disclosure of reliable and comprehensive environmental information through environmental and/or sustainability reports

**Appendix A2. Assessment guidelines for the buyers' GSCM**

	Evaluation guideline		
	1 (Low)	2 (Medium)	3 (High)
<p><b>Specific elements for green supply chain management evaluation</b></p> <p><i>Monitoring-based GSCM (Green requirements)</i></p> <ol style="list-style-type: none"> <li>1) Greener part and material provide (e.g., harm-free or more recyclable products)</li> <li>2) Efforts for cleaner production as well as full compliance with regulations (e.g., reduction at a source and MSDS management)</li> <li>3) A company-wide environmental management system and practices (e.g., EMS implementation and environmental training programs)</li> <li>4) Green procurement and logistics practices (e.g., green purchasing and reduction of emission and waste in logistics)</li> <li>5) Cooperation with stakeholders (e.g., participation in environmental protection program, claim-management procedure implementation, and environmental report publishing)</li> </ol>	<p>A buyer hardly requires those elements for its suppliers</p> <p>A buyer does not consider those environmental factors when it evaluates and selects suppliers in its procurement process.</p>	<p>A buyer officially requires its suppliers to improve their environmental performance in those elements</p> <p>A buyer considers those environmental elements in its general procurement process, but the portion is not significant</p>	<p>A buyer demands its suppliers to undertake those environmental practices very seriously</p> <p>The portion of environmental criteria in a buyer's procurement process is very substantial, so it is often critical for the suppliers to consider the buyer's criteria.</p>
<p><i>Support-based GSCM (Environmental support)</i></p> <ol style="list-style-type: none"> <li>1) Analysis of environmental profile of the incoming-goods or collaborative greener product development</li> <li>2) Diagnosis and improvement of the environmental profile of the operations</li> <li>3) Environmental management system implementation and environmental education and training provide</li> <li>4) Green procurement procedure implementation</li> <li>5) Environmental protection program and environmental information disclosure</li> </ol>	<p>A buyer does not provide any managerial or technical assistance to its suppliers in undertaking those practices and implementing systems and/or procedures.</p>	<p>A buyer gives the suppliers practical assistance for undertaking those practices and implementing systems and/or procedures, but the range of the support is limited and/or the support is given to a small number of the suppliers.</p>	<p>A buyer gives its suppliers a wide range of in-depth managerial and technical assistance for undertaking those environmental practices and implementing systems and/or procedures.</p>