TCO DEVELOPMENT

About GreenScreen™ for Safer Chemicals

GreenScreen™ for Safer Chemicals (GreenScreen) is developed by the non-profit organization Clean Production Action (CPA). The methodology provides a structured approach to evaluating a comprehensive set of human and environmental health and safety data, as related to chemical substances.

The methodology

- distils complex hazard evaluations down to an easy to understand hazard table
- places chemicals along a continuum of concern and assigns a chemical one of four possible benchmarks as described in Table 1, below.
- can be used to select environmentally preferable, safer chemicals for use in products and processes, supporting the health of users and the environment.

Benchmark key		
Benchmark 4	Few concerns, i.e. safer chemical	Preferable
Benchmark 3	Slight concern	Improvement possible
Benchmark 2	Moderate concern	Use but search for safer substitutes
Benchmark 1	High concern	Avoid
Unspecified (U)	Insufficient data to assign a benchmark	

Table 1 – GreenScreen Benchmarks

Q&A: TCO Certified Criteria - Non-Halogenated Substances.

1. **Why is TCO Development interested in the GreenScreen methodology?**
   TCO Certified aims at guiding manufacturers towards safer alternatives to hazardous chemicals used today. In the case of the new generation TCO Certified, we are including GreenScreen in an effort to provide more knowledge about the non-halogenated flame retardant substances used in products we certify. Previously we referred to a number of risk phrases/hazard statements but such an approach has its limitations. One of the main concerns with a risk phrase/hazard statement-based criterion is that no risk phrases/hazard statements for a chemical can either mean "no hazard" or "data gap". GreenScreen is a method for comparative Chemical Hazard Assessment (CHA) and builds on the US EPA DfE approach and other national and international precedents (REACH, OECD, GHS). We have reviewed other assessment tools but selected GreenScreen since we consider it has several advantages:
   - Based on a structured decision logic
   - Looks at all constituents
   - Looks at several stages in the life cycle of the chemical such as transformation/breakdown products and also includes the environmental evaluation of those
   - Takes into account new studies/data and assessments are updated every few years. Benchmarks are only valid for 3 years
   - Considers 18 environmental and human health endpoints
   - Helps close data gaps by providing incentives for companies to produce data (chemicals missing important data are downgraded to a lower Benchmark or listed as "Unspecified")
   - We know what we allow and not only what we ban
   - Information is freely and publicly accessible, transparent and peer reviewed.

2. **Why does the proposed mandate only include GreenScreen and no additional compliance alternative?**
   The GreenScreen methodology is the closest to TCO Development's ambition for assessing chemicals in an easily comprehensible and overarching way by including the specific advantages given in Question 1. From a gap assessment standpoint, TCO Development did not consider there was another assessment tool that incorporated equal advantages. An alternative option therefore could be less strict and cause judgement conflicts of a substance. Also the GreenScreen methodology and TCO Certified Accepted Substance List will require ongoing monitoring by TCO Development, which will involve considerably more resources if there are more compliance options to oversee.

3. **How is a substance evaluated in accordance with GreenScreen?**
   A GreenScreen evaluation of a substance covers 18 human and environmental health hazard endpoints. Each of the 18 hazards receives a classification of concern ranging from Very High to Very Low. Based on these classifications the substance is then assigned an overall Benchmark score of 4, 3, 2, 1 or U. Benchmark 1 is the lowest score and according to CPA, aligns with the criteria for Substances of Very High Concern (SVHC) in the European Reach Regulation. A substance assigned U (undefined) is due to data gaps, where too much important data is missing.

4. **What are the 18 environmental and human health endpoints considered?**

Environmental fate	Environmental health	Human health group I	Human health group II	Physical Hazards
Persistence (P)	Acute Aquatic Toxicity (AA)	Carcinogenicity (C)	Acute Mammalian Toxicity (AT)	Reactivity (Rx)
Bioaccumulation (B)	Chronic Aquatic Toxicity (CA)	Mutagenicity & Genotoxicty (M)	Systemic Toxicity & Organ Effects (incl. Immunotoxicity (ST)	Flammability (F)
		Reproductive toxicity (R)	Neurotoxicity (N)	
		Development Toxicity (incl. Development Neurotoxicty (D)	Sensitization (SnS)	
		Endocrine Activity (E)	Respiratory Sensitization (SnR)	
			Skin Irritation (IrS)	
			Eye Irritation (IrE)	

Table 2; Environmental Endpoints considered in GreenScreen

5. **In what form are flame retardants assessed?**
Flame retardants may be inorganic or organic (e.g. phosphorous- or nitrogen-based, monomeric or polymeric). If the flame retardant is reactive, it is the hazard properties of the original substance that are of relevance.

6. **Why consider only the hazard properties and not risk and exposure?**
The risk of a chemical is dependent on the hazard of that chemical and the probability of exposure to humans or environment. The probability is, however small, never zero. In order to take the safest alternative the answer is therefore to minimize the hazard. No hazard means no risk.

7. **Who may conduct GreenScreen evaluations?**
To be accepted by TCO Certified, all assessments and reassessments shall be conducted by a licensed GreenScreen profiler. Licenced profilers are organizations approved by Clean Production Action, that have demonstrated expertise in toxicology and chemistry and that have the capacity to provide GreenScreen assessments on a consulting basis. The licensed profilers are kept up to date on all method revisions, and CPA audits their application of the method to ensure that it is being applied as intended

8. **How can someone become a GreenScreen Profiler?**
See http://www.GreenScreenchemicals.org/professionals/profilers and contact Clean Production Action at www.cleanproduction.org

9. **What is the TCO Certified Accepted Substance List?**
This is the list of substances approved for use as flame retardants in TCO Certified products. The list is found on the TCO Development web site. The list is dynamic, which allows new substances that have undergone a valid assessment to be added or for approved substances to come under reassessment in light of new scientific findings.

10. **Why are CAS numbers published on the TCO Certified Accepted Substance List and not product names of the flame retardants?**
    A CAS number is a unique identifier for a chemical substance. This is important since the same substance may have several different product names. The product name of a flame retardant does not give any information on the ingredient(s). Some stakeholders in the industry prefer that CAS numbers are not disclosed as it may reveal trade secrets of flame retardants. These stakeholders prefer that the products name of the flame retardant are listed instead.

    - By listing the CAS numbers it is possible for any stakeholder to question the GreenScreen assessment and benchmark score as the assessed substance is known.
    - By listing the CAS numbers the assessment of a substance will only have to be done once, saving time and money.

11. **How have the first substances on the Accepted Substances List been chosen?**
    Many of the GreenScreen assessments are initially based on the information reported in the "An alternative assessment for the Flame Retardant Decabromodiphenylether (DecaBDE) Final Report" initiated by the US EPA Dfe and ENFIRO. These results have been translated to GreenScreen benchmarks by Clean Production Action approved profilers.

12. **How can an outcome of a GreenScreen assessment be independently evaluated?**
    The substance draft report by the licenced profiler goes through a validation program, where an independent toxicologist appointed by the CPA reviews and comments on the report and verifies the GreenScreen benchmark.

13. **Why has TCO Development chosen not to have a public list of restricted chemicals?**
    It will be difficult for us to keep such a list updated. We rely on the information sent to us by the applicants and chemical manufacturers. They will send verifications of approved chemicals, not those that have not been approved

14. **Why only include flame retardants?**
    Moving from a risk phrase/hazard statement-based criterion to GreenScreen is significant for certifying applicants and we have therefore decided to start with flame retardants where there is quite a lot of data already available from projects such as EPA Design for Environment and the EU ENFIRO-project.

15. **Why has TCO Development chosen benchmark 2 as the minimum level of acceptance?**
    This decision is based on current knowledge on alternative flame retardants. Restricting flame retardants with benchmark score 1 gives industry enough options for safer alternatives. As our list of preferred chemicals is filled we will of course see when there are enough alternatives with benchmark 3 or 4 for us to also progressively limit the use of benchmark 2 chemicals.

16. **What if a chemical is benchmarked as U (unspecified)?**
    GreenScreen helps close data gaps by providing incentives for companies to produce data. Therefore, chemicals missing important data are downgraded to lower Benchmarks or deemed as Unspecified. When enough data gaps for a chemical are filled, then this will lead to other benchmark results.

17. **Why is the benchmark only valid a limited amount of time?**
    Substances are assessed at 3-year intervals since mandates are revised and more data and new knowledge on the substance may lead to other results.

18. **How much is charged for a GreenScreen assessment?**
    To save cost and lead time TCO Development only requires a draft benchmark assessment in order to put a substance on the TCO Certified Accepted Substance List. The draft report of the FR/substance by the licenced profiler can cost USD 800 - 5,000, depending on the complexity of the assessment and the licensed profiler that has been chosen. Each licensed profiler is independent from TCO Development and sets their own pricing. Currently there are four licensed profilers to select from.

    A validation assessment by an independent toxicologist appointed by the CPA to review, comment on the report and verify the GreenScreen benchmark costs approximately USD 2000. However, this is normally not needed to put a substance on the TCO Certified Accepted Substance List.

19. **How can I view a full GreenScreen assessment of a substance?**
    Assessments are available on the IC2 database. Also the possibility to purchase assessments is available from other sources such as Techstreet Store. If a substance is on the Accepted Substance List but no full assessment report is publicly available, then TCO Development may on approval place interested persons in contact with the owner of the report.

20. **Is the panel included?**
    Yes, the flame retardants used in the plastics of the panel are included and must be assessed.

21. **What is the process of adding a substance to the TCO Certified Accepted Substance List?**

    1. An applicant company wants to certify a product.
    2. The applicant needs to contact their plastic manufacturer to ensure that all plastics used in the product to be TCO Certified (both the outer casing and the panel) only use flame retardants with ingredients on the “TCO Certified Accepted Substance List”.
    3. If any substance used as a flame retardant ingredient is not on the “TCO Certified Accepted Substance List” then the plastic manufacturer must contact one of the licensed profilers listed on the CPA website.
    4. The licensed profiler conducts a normal GreenScreen draft assessment of all ingredients in the flame retardant that are not already on the list and sends the full GreenScreen draft report per substance to the plastic manufacturer.
    5. The plastic manufacturer sends the full GreenScreen draft report to TCO Development who will place the substance on the “TCO Certified Accepted Substance List” as long as the benchmark score is higher or equal to 2. TCO Development will keep one copy of the GreenScreen report as a source file for the list.

6. When the applicant gets an approval confirmation from their plastic manufacturer the applicant may continue the application process. This involves signing all environmental and social templates and sending the product for testing at an approved test facility (listed on TCO Development webpage). One template that the applicant needs to sign is the template confirming that all substances used in flame retardants in plastics are on the "TCO Certified Accepted Substance List". The accepted test laboratory reviews all signed templates and test reports and issues a one page verification report stating that the product complies with the criteria in TCO Certified.
7. Finally the applicant can take their verification report and send it together with the application to TCO Development. TCO Development issues the certificate.

22. What is the process of removing substances from the list?

The substances on the TCO Certified Accepted Substance List will remain on the list until new information (new Green Screen report possibly with a verification stage) is provided, proving that the benchmark shall be lower than 2. If that happens the substance will be given a sunset date of at least one year until it will be removed from the list.

23. Grace period during assessment or substitution?

You can apply for TCO Certified Displays 7 directly. If a plastic manufacturer needs time to assess the substance, it is possible to send a time plan to TCO Development, specifying the time it will take and attach a quote from the licensed profiler. Then we will allow a grace period and issue the certifications directly while we are waiting for the results from the profiler.

TCO Development allows a one year grace period to assess a substance (which normally takes 1-8 weeks) and to substitute it. If a plastic manufacturer gets a benchmark 1 they shall send a time plan to TCO Development where they describe how they will substitute the substance and remove it from production. TCO Development thinks that it is reasonable to assess, and if necessary, substitute the substance during one year. During this time applicants can still keep their TCO certificate. If special conditions apply to a substance then we require an explanation from applicants in order to prolong any grace period.

It is in our interest with the GreenScreen criterion that unknown substances are assessed and if they are proven to be dangerous they shall be substituted. If new information becomes available (for example if a reassessment is necessary due to new information that is available about the substance) then we can discuss if it is possible to extend the grace period. This would require the applicant to show that they are making serious and genuine efforts to assess or substitute the substance in question.

24. How to manage different GreenScreen® Benchmark scores for the same substance

If there are different GreenScreen Benchmark scores for the same substance verification step is necessary to resolve differences in the Benchmark scores. If any stakeholder wishes to challenge a substance on the Accepted Substance List then that stakeholder pays for the verification step, including issuing a revised GreenScreen assessment report.

TCO Development will also review the substances on the Accepted Substance List on a regular basis and will finance a new GreenScreen and verification step during this review if TCO Development considers it necessary.

25. **How to ensure that all relevant data are used in certified GreenScreen assessments (e.g. modelling, read-across)?**
    Certified GreenScreen assessments are completed by licensed GreenScreen Profilers. GreenScreen Profilers are organizations with demonstrated expertise in toxicology and chemistry; as such they have expertise in using all available data, including empirical and modelling data, in determining levels of concern for the 18 endpoints that are included in GreenScreen assessments. Certified GreenScreen assessments include a comprehensive review of all available information including 1) measured data from standardized tests and scientific literature, 2) estimated data from suitable analogues and models, and 3) hazard lists.

    If a manufacturer would like confidential data to be part of the evaluation this data may be provided under non-disclosure agreement (NDA) to the Licensed Profiler.

26. **How effective is GreenScreen verification?**
    TCO Development considers the GreenScreen system to be robust, predictable and to have a good balance between assessment cost and proficiency.

27. **Are there actual differences between GreenScreen results and GHS regulatory classifications?**
    GreenScreen is a comprehensive method for assessing the hazards of chemicals. As such, it includes hazard criteria for 18 endpoints. In certified GreenScreen assessments, Licensed Profilers apply the hazard criteria to arrive at a hazard level for each endpoint that may range from very Low (vL) to very High (vH).
    GHS criteria for assigning hazard levels are integrated into GreenScreen. The Licensed Profilers apply GHS and other specified criteria in assigning hazard levels for each endpoint. The criteria for assigning hazard levels by endpoint are clearly defined in the guidance document for GreenScreen method (see http://www.greenscreenchemicals.org/method/full-greenscreen-method). Thus it is plausible that the hazard level assigned to an endpoint in GreenScreen may differ from a GHS regulatory classification, but the rationale for the endpoint hazard level will be clearly stated in the certified GreenScreen assessment by a Licensed Profiler.

28. **Is the Green Screen process sufficiently mature for setting standards?**
    TCO Development has evaluated the GreenScreen process together with stakeholders from the IT industry and chemical industry (Pinfa) and are of the conclusion that the process is sufficiently mature for inclusion in TCO Certified.

29. **What if a substance is on the TCO Certified Accepted Substance List but (according to information not known to the licensed profiler who made the assessment) it will probably not be there in 3 years.**
    If a manufacturer is worried that a substance that is on the Accepted Substance List may get a future GreenScreen benchmark 1, then it is advisable to start phasing out that substance from production. Substances that result in a GreenScreen benchmark 1 are very likely to be banned by regulatory systems in many countries irrespective of TCO Certified.

30. **What if a substance is not on the TCO Certified Accepted Substance List but all evidence points to it being non-hazardous and safe?**
    In this case it is advisable to get the substance GreenScreen assessed by a licensed profiler.

31. **What if a modern flame retardant has better functional properties than an older version of the same type of flame retardants? If the modern flame retardant gets a GreenScreen benchmark score lower than 2 then do applicants not use this in products to be TCO Certified, sacrificing these improved properties and go back to an older flame retardant?**
    TCO Development generally regards it unacceptable to use a flame retardant substance with a GreenScreen benchmark score lower than 2 even if the properties of this flame retardant are better than an older version. However, a manufacturer may present the benefits of the new flame retardant to TCO Development and TCO Development will investigate this trade-off.