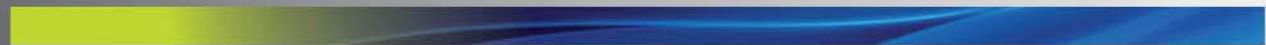


Workshop On Capping Design In South Africa

Product Showcase

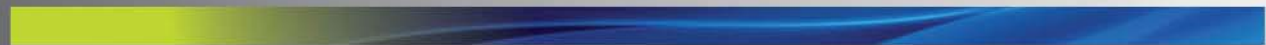
By

Tyrone Naidoo



Kaytech Introduction

- **Kaytech providing Africa with Geosynthetics for over 40 years**
- **Offering geosynthetic solutions to corporations dealing within the built environment**
- **Level 3 BBB-EE supplier**
- **Branches country wide**



- Locally manufactured products include;



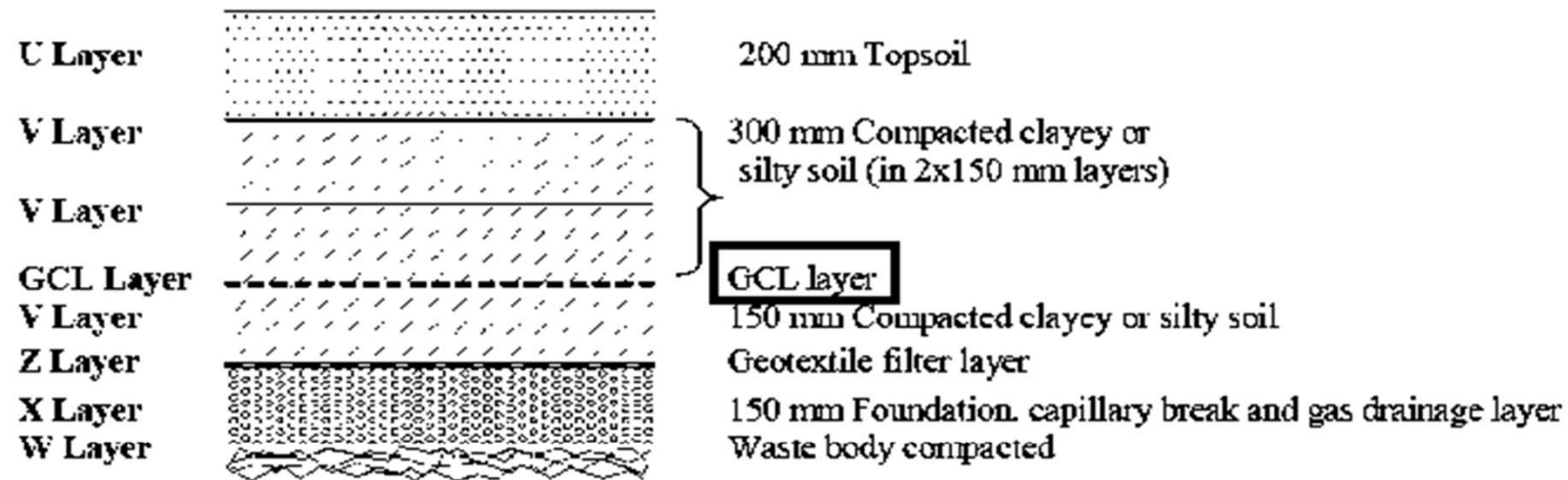
Purpose of Capping Landfills

“Minimum Requirements for Waste Disposal by Landfill ,2nd Edition 1998”

- I. It separates the waste body from the atmospheric environment. The cap is the only layer protecting and isolating the waste from the long term effects of wind and water erosion, burrowing animals etc.

- II. It limits and controls the quantities of precipitation that enters the waste. It should also allow water to leave the landfill by evapotranspiration and vent landfill gas in a safe manner.

FIGURE A.8.13
Cover: G:M:B⁺, G:L:B⁺ and Hazardous Landfills
(and all sites with inadequate bottom liners)

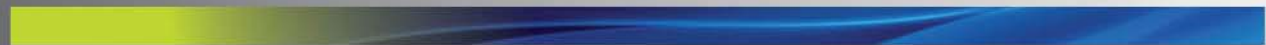


NOTE:

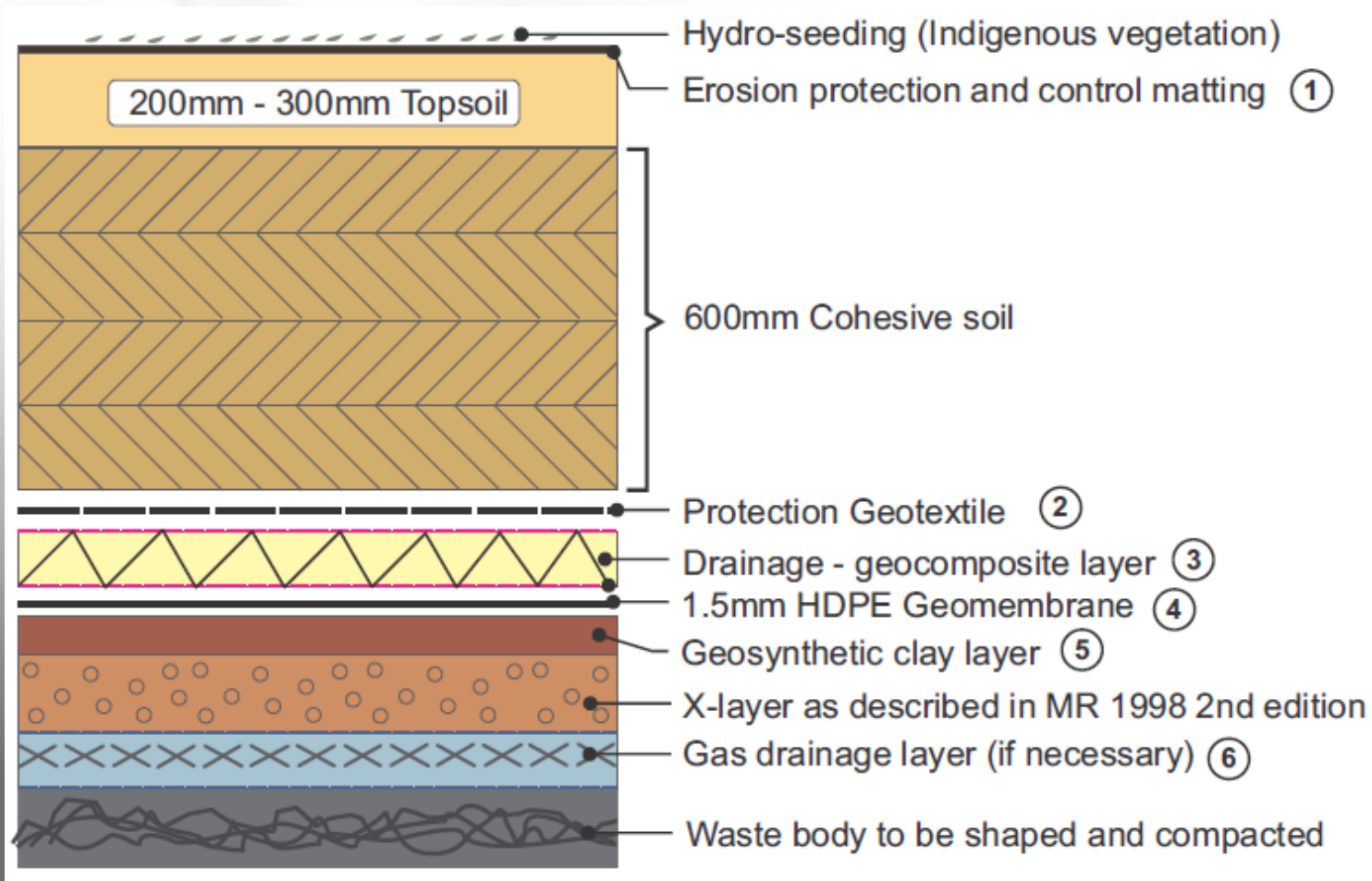
The design of covers is highly dependent on site-specific circumstances, e.g., nature of waste (wet, dry, putrescible). Although the primary function of the cover is to keep water out of the waste body, the cover design will also be affected by the containment and gas management philosophy adopted and the preferred materials and technology (e.g., clay, GCLs and FMLs) for the given situation. Cover designs should be based on the above figures. However, at the discretion of the Competent Authority, components and configurations may be varied.

Why Use Geosynthetics in Capping's?

- **Quality controlled through its manufacture in a factory environment**
- **Rapid Installation**
- **Geosynthetics can supplement natural materials such as CCL's**
- **Often makes impossible situations possible**
- **Cost competitive against soils and construction materials**



Functions of Geosynthetics In Capping's



Kaytech's geosynthetics that fulfil the
described functions

bidim[®]

 **enviroFIX**[®]

 **SoilSaver**[®]

 **intermas**

1. Erosion Protection and Control Matting

Why Erosion Protection?

To protect seedlings and establish vegetative growth over time. Well established growth thereafter mitigates the effects of erosion caused by wind and water.

What can we do to combat erosion?

Offer a protective netting structure such as Soil Saver , which is:

- 100% Natural jute Yarn (decomposition provides fibres that strengthen soil structure)
- Soil Saver contains no plastics toxins or pollutants
- Flexible for easy draping around soil surface
- Structure and hairy strands traps seeds and reduces run-off velocity



**SoilSaver**®

Multi-Cell Geocell for Erosion Protection

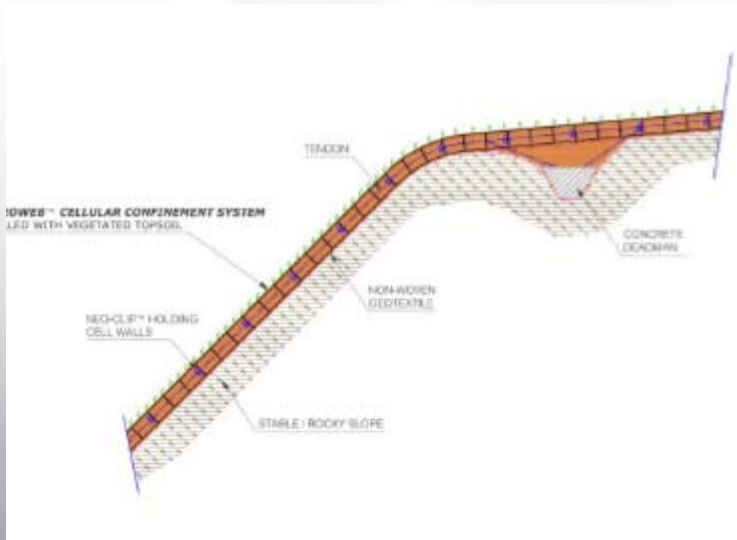
- For slope protection
- Manufactured from slit film woven tape UV stabilised PP
- Economical and effective cellular confinement system
- Flexible to conform to existing surfaces
- Rot proof and resistant to most chemicals and ultra violet light
- Cells can increase the natural angle of repose on a slope



PRS Neoweb (Neoloy Geocells)

- Honeycomb 3D Geocell
- Through confinement, stabilises and reinforces soil/infill
- Alloy of polyester and HDPE forming the patented NEOLOY
- High Resistance to temperature extremes
- SIM Accelerated Creep Test 30mins @ 58°C showed change as follows :
 - Neoloy 3.53mm and HDPE 32.55mm this due to the alloy of polymers used to manufacture the Neoweb geocell

PRS Neoloy Geocells



Stable Slopes	Solution	Fill	Anchorage
1:3-2:1 (18° - 63°)	Erosion control Green solution	Vegetated, local soil infill	Stakes, tendons, crest deadman

2. Protection/Separation Geotextile

Why protection/separation geotextiles?

Placed between dissimilar materials to maintain the integrity and functioning of both materials.

What can we do to ensure protection of materials?

Offer a cushion type material to prevent against puncture and transfer of materials to structures below, a material such as **bidim**[®].

- 100% Polyester Material
- Needledpunched therefore;
- Appreciable thickness
- High resistance to puncture , tearing and burst
- Flexibility /conformability which is advantageous during laying operations

bidim[®]

2. Protection Geotextile Cont..

bidim[®] gives us ease and speed of installation especially on slopes when compared to sand protection layers



bidim[®]

3. Drainage Geocomposite Layer

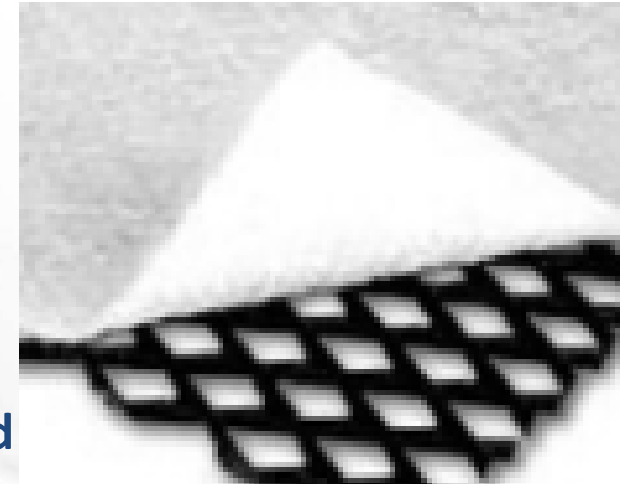
Why drainage geocomposites?

To allow for the free drainage of soils placed over the composite liner & waste material in a capping situation. The water must be directed to an outlet point and discarded in a safe manner.

What can we do to ensure free drainage of soils?

Offer a granular filter layer to allow for the movement of water freely without compromising the capping structure.

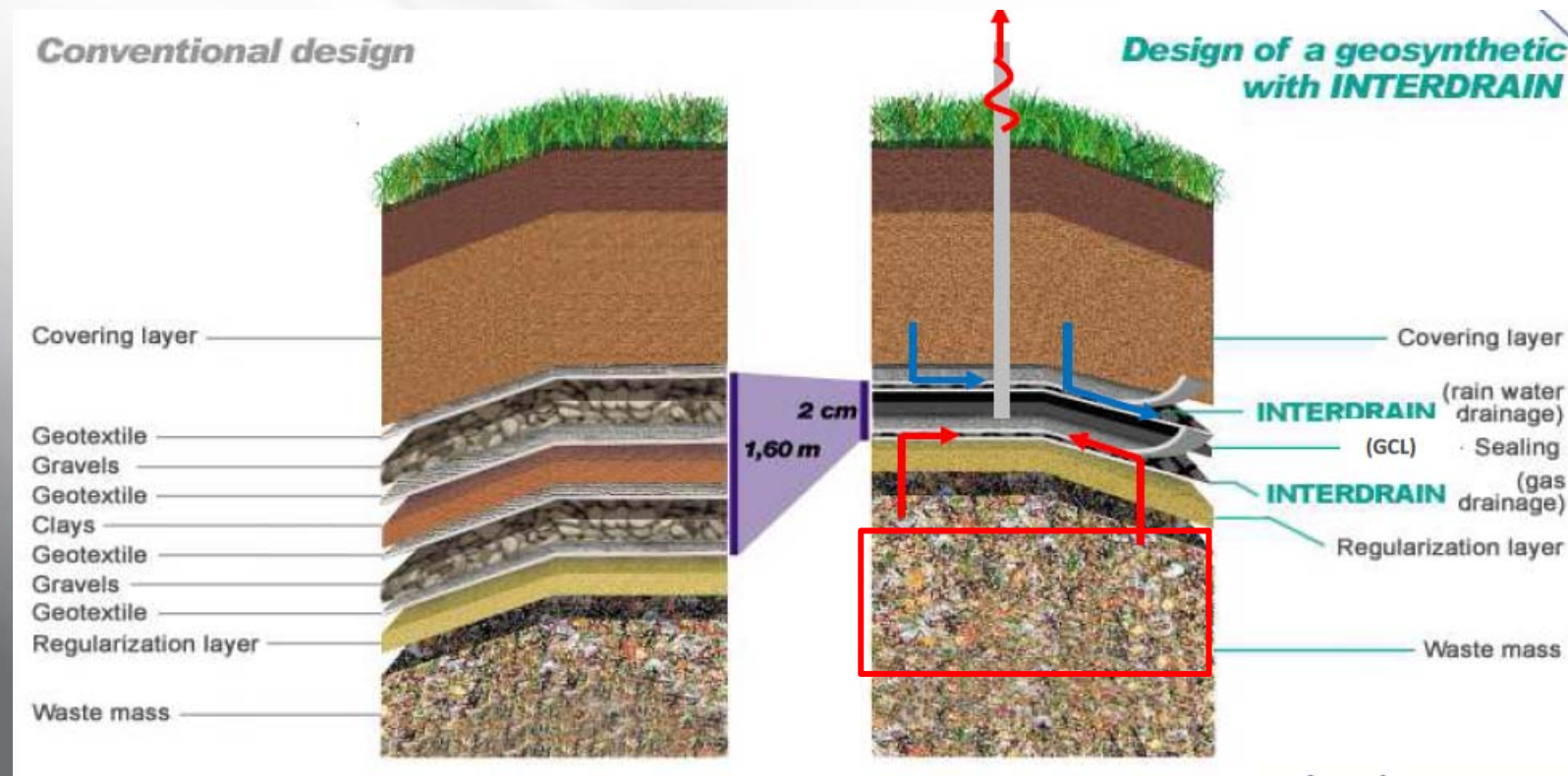
- Composite geonets such as the GMG 412/512 can be used
- Biplanar HDPE Geonet with Polypropylene GTX bonded on both sides
- Carbon Black Stabilised
- Geotextile Thickness can vary depending on client needs
- Can replace more than 150mm of granular material



3. Drainage Geocomposite Layer Cont.

What can we do to ensure free drainage of soils?

- These net systems are also available in Tri-Planar configuration
- Tri-Planar nets can be used to replace expensive gas extraction layers (granular material and geotextiles)



4. Geosynthetic Clay Liner layer

GCL'S in a Cover System?

- More cost effective to use a GM/GCL than GM/CCL configuration
- They can either replace or supplement the use of CCL's
- GM/GCL covers work to the advantage of old landfills with no lining systems below by almost preventing any form of infiltration

What can Kaytech offer?

- EnviroFIX® Thermal Lock® and needlepunched Geosynthetic Clay Liner
- Needle punched for increased shear strength and stability advantages - important to any application
- Thermal Lock® process further enhances the internal shear stress



4. Geosynthetic Clay Liner layer continued

What can Kaytech offer?

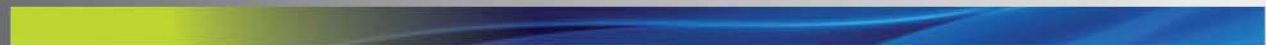
- Using the EnviroFIX® GCL can completely or partially replace thick multi-lift compacted clay layers
- Difficulty of covering a slope using CCL especially over unconsolidated waste -can be overcome using EnviroFIX® GCL



5. Other Kaytech Geosynthetics Used in Cover / Capping Applications

**Remediation of CaSO_x Dams at the BMR Smelter-
Marikana, NW Province for Lonmin Platinum**

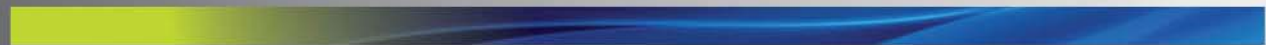
Special Thanks to PLC (Peter Legg Consulting)



5. Case Study: Kaytech Geosynthetics Used in Cover/Capping Applications

Problem:

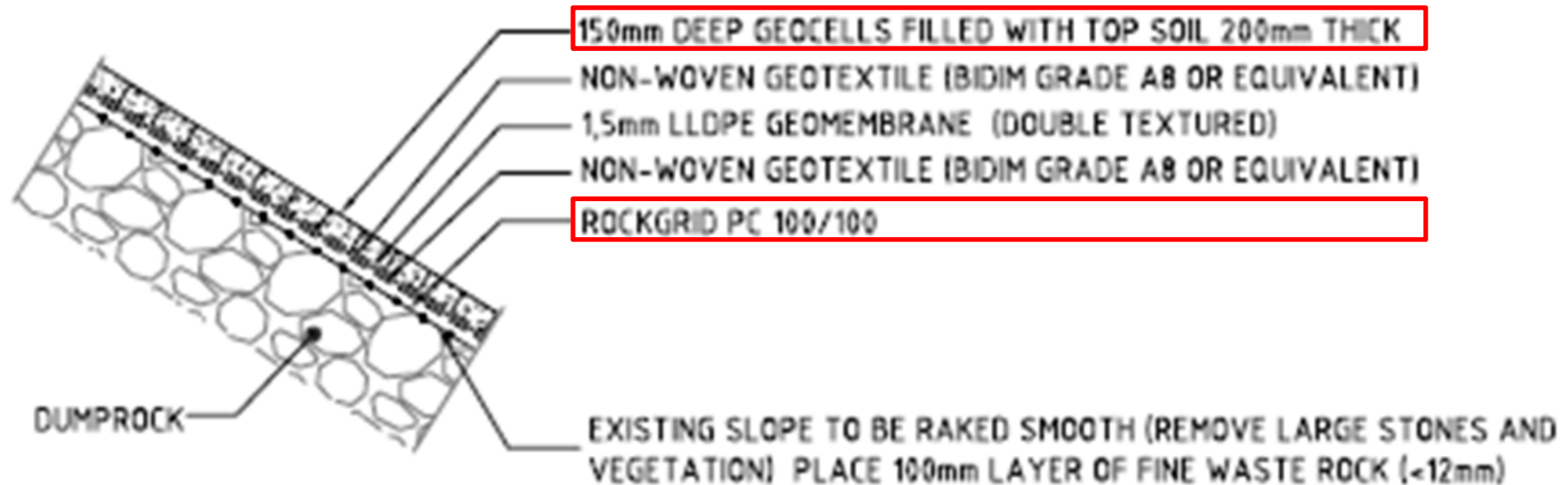
- **Very Soft Surface of CaSO_x (Aim for a stable surface)**
- **Steep Outer Side Walls approximately 1:2 (Aim: Contain Fill on Slopes)**
- **Localised Stability problems (Create a proper working surface for heavy machinery to complete the cover structure)**



Capping layers (top down)

- 300mm topsoil (black turf)
- **Geocells on side slopes to retain topsoil**
- Geotextile protection layer (bidim A8)
- 1.5mm double textured LLDPE geomembrane
- Layer of contaminated soil
- Mine waste rock to form dome shape
- **Geogrid support layer (RockGrid PC100/100)**
- Megaflo drains to drain water from surface

Detail Sections



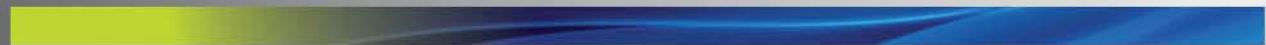
DETAIL 2 - CAPPING SPECIFICATION
ON SIDE SLOPES

RockGrid PC



RockGrid PC

- **RockGrid Pc is the first composite geotextile to be manufactured in South Africa**
- **Offers the reinforcement characteristics of both geogrids and wovens in conjunction with the favourable hydraulic qualities of nonwovens**
- **The nonwoven is strengthened with high tenacity multifilament yarns**
- **The nonwoven layer tends to protect the reinforcement elements during the critical installation phase**
- **Nonwovens in conjunction with wovens ensure a safer optimum performance**



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