CITEL

VG TECHNOLOGY



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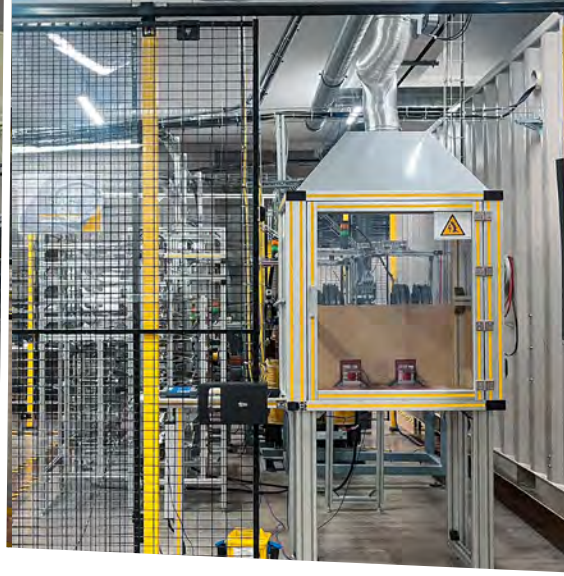
Beyond its appearance, the value of a piece of equipment lies in its operational performance. When it comes to surge protection, that is what truly matters: in critical moments, the only thing that counts is a device capable of delivering smooth, reliable, and virtually invisible protection on a daily basis.

In a world in which electrical systems are becoming ever more complex and at the same time ever more critical to our daily lives, average is no longer enough. Systems must work - reliably, permanently, without exception. Failures mean downtime. And downtime means loss - whether in industry, in energy supply networks, in buildings or in infrastructure.

The requirements for surge protection systems have literally grown exponentially in recent years: more sensitive electronics, connected systems, decentralised feed-in, higher protection levels, higher standards, increased responsibility for availability and sustainability. At the same time, the pressure to plan systems efficiently and operate them with minimum maintenance is increasing. Conventional protection devices are increasingly reaching their limits.







CITEL recognised this change very early on. More than 20 years ago, a completely new concept was developed with VG technology - not as a reaction to problems, but as a proactive response to what electrical systems really need today and in the future: **maximum protection, uncompromising operational reliability and long-term cost-effectiveness.**

Today, in its third generation, VG technology is a globally proven standard in demanding applications. It is based on a sophisticated hybrid principle: a gas-filled spark gap (GSG) combined with a varistor - two well-proven technologies, whose weaknesses compensate for each other and whose strengths are maximised.

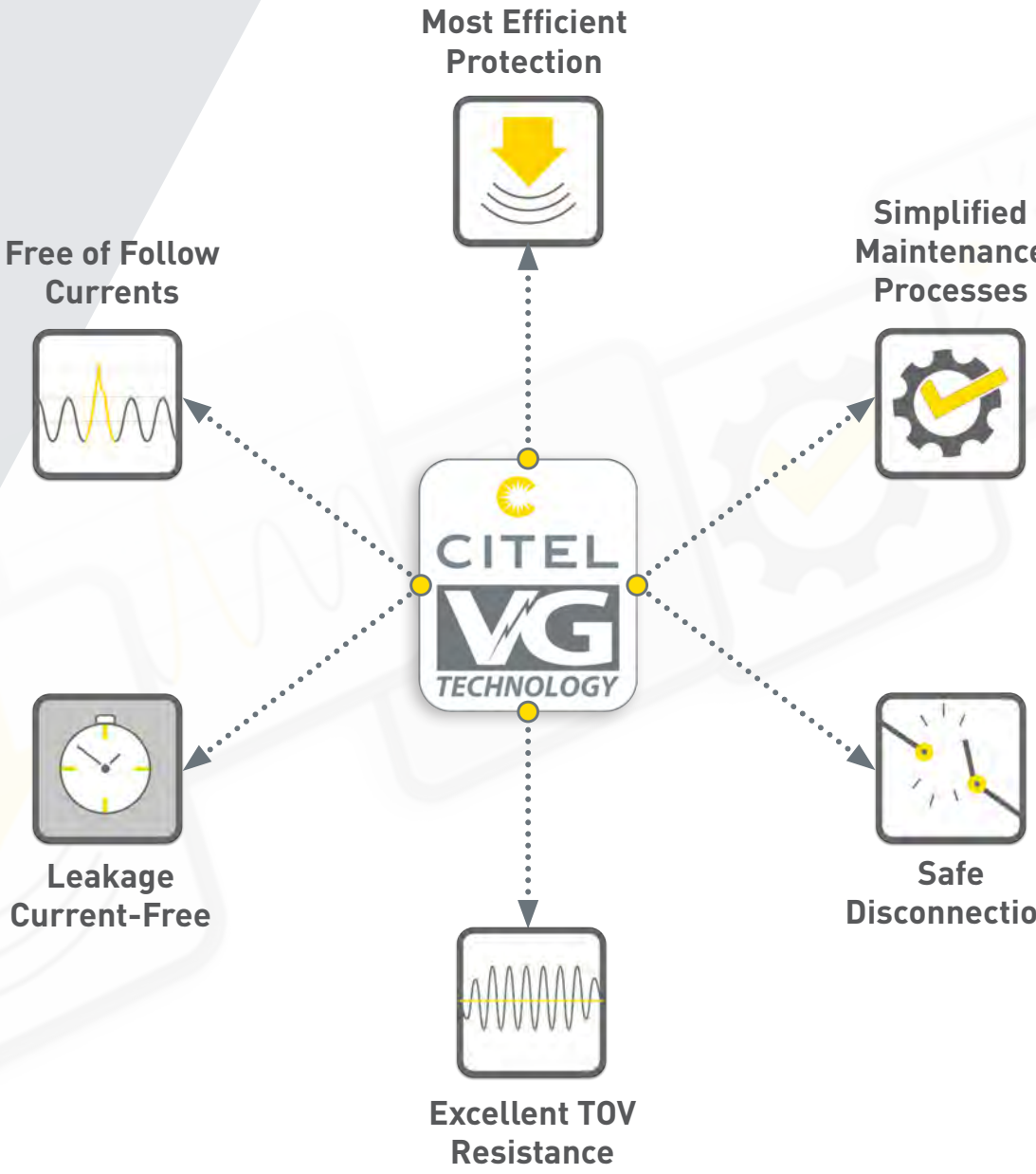
But VG is more than just a technical solution. **VG is a commitment:**

- No leakage current.
- No grid follow current.
- No unnecessary ageing.
- No failures when it matters.
- No compromises at critical situations.

What CITEL has created with VG is not a temporary trend, but a long-term, proven, low-maintenance, reliable protection platform for everyone who is responsible for the safe operation of electrical installations - whether as a planner, operator, technical sales representative or decision-maker in the project business.

If reliability is not an option, but a precondition - then VG is the answer.

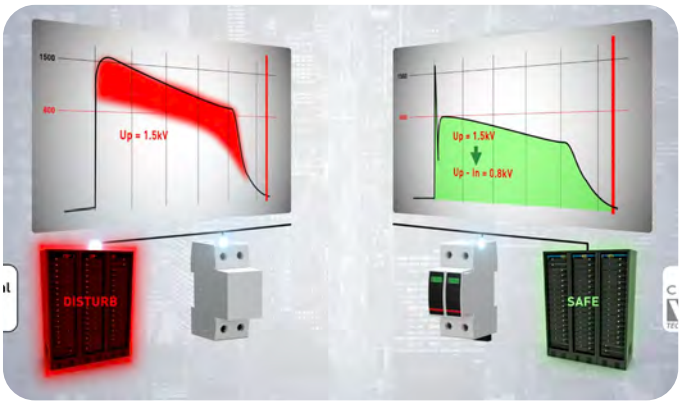
THE ADVANTAGES OF VG©TECHNOLOGY

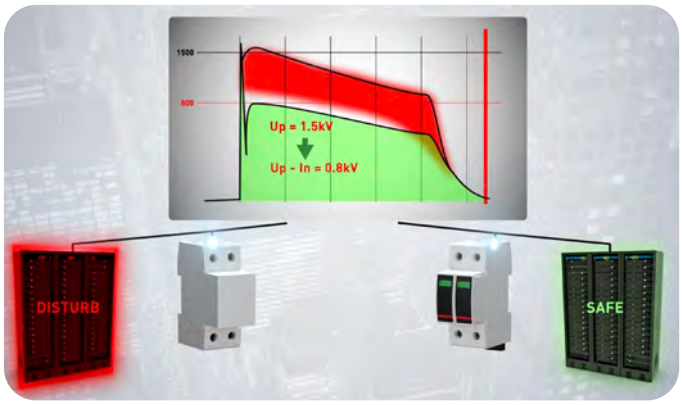




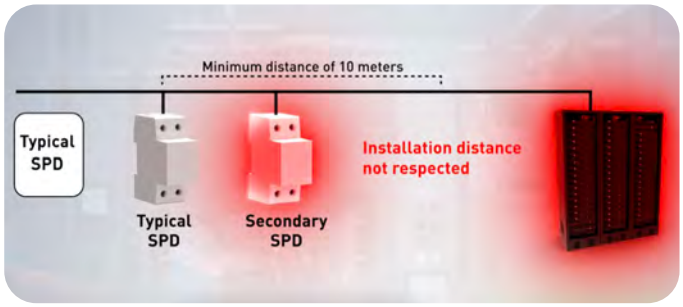
1. Most Efficient Protection - with Minimal System Load

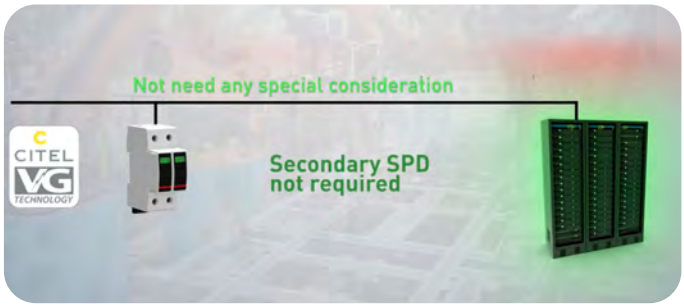
VG technology reduces the energy transmitted to a minimum - and thus protects connected systems more sustainably than conventional SPDs. Less energy means less stress for sensitive electronics, a longer service life and a lower risk of failure. This is a decisive advantage, especially in sensitive or business-critical applications (e.g. industry, building automation, IT infrastructure).





VG also demonstrates its strength in multi-level protection structures: the low letthrough energy ensures proper coordination with downstream SPDs - regardless of the manufacturer. This makes VG more than just powerful; it is also **compatible and flexible to use** - ideal for heterogeneous installations or system retrofits.





LED lighting systems are a special case in which VG is particularly effective. Due to short cable lengths, there is often a lack of decoupling between the SPD and LED driver - conventional solutions tend to fail. **VG provides reliable protection even in these demanding setups**, prevents premature failures and significantly increases the service life of the LED components.

In a nutshell:

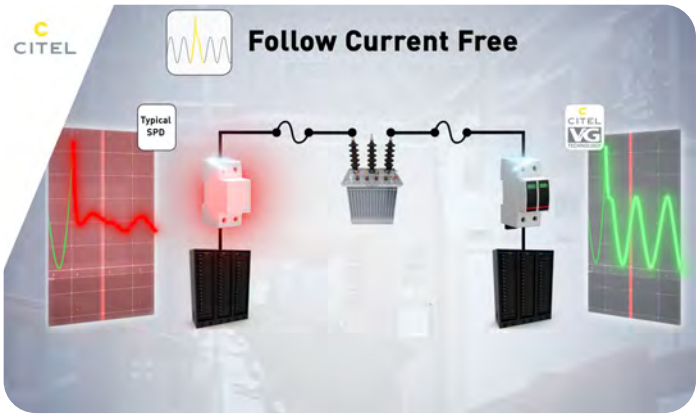
- **Minimal energy feed into the system** - maximum service life of the appliances
- **Improved coordination in multi-level protection concepts** - also across different manufacturers
- **Highly effective with LED systems** - avoids failures due to overstress

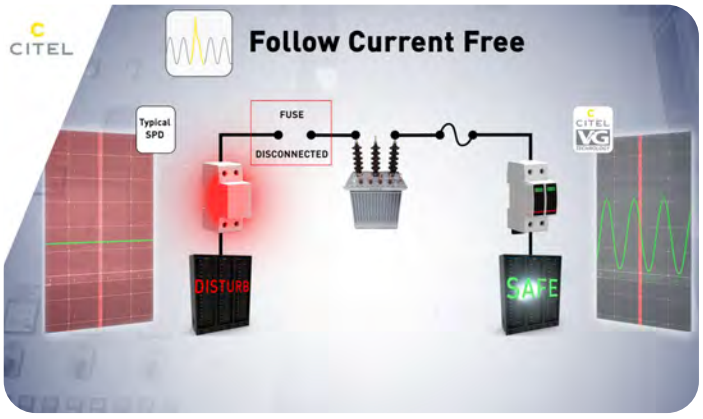
2. Free of Follow Currents - no Failures, no Shutdowns

With many classic SPD technologies, a conductive connection remains after a discharge process - so-called grid follow current. This can lead to short circuits, false tripping of fuses, unnecessary shutdowns or even to the entire system being switched off. This is not only disturbing, but also a risk to operational safety - especially in critical infrastructures.

VG technology operates completely free of grid follow current. After an surge event, the protective device immediately returns to a high-impedance state. No residual current flows, no fuse is triggered and the system remains stable and available - exactly as it should be

VG also fulfils all requirements with regard to SSDs (SPD-Specific Disconnectors) in accordance with the upcoming IEC standard: No unintentional disconnection processes, no interference due to subsequent faults - and therefore a significant advantage.





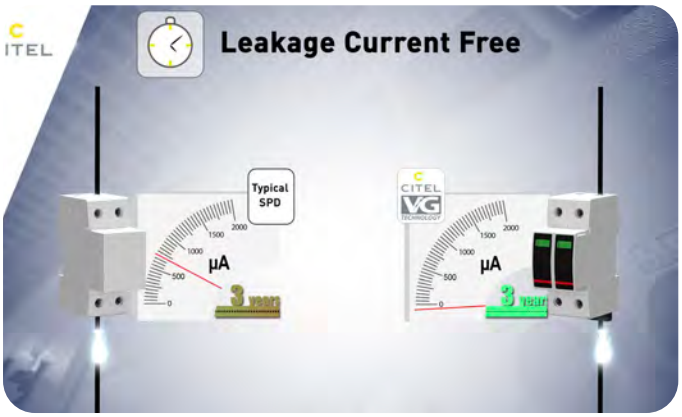
An additional advantage: VG does not cause any short-circuit currents in the grid - this reduces thermal loads, extends the service life of the installation and ensures the continuous availability of the power supply.

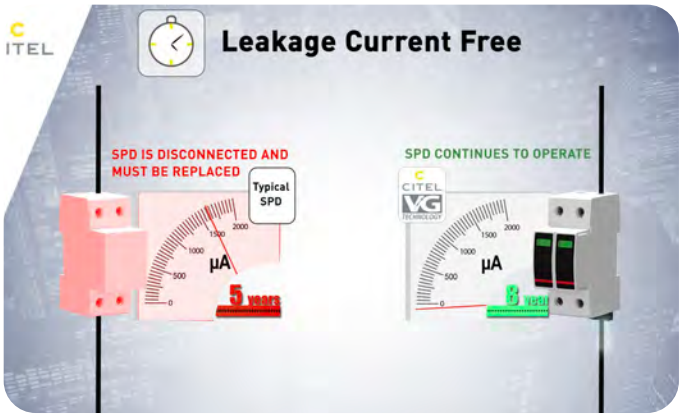
In a nutshell:

- **No tripping of fuses, MCBs or SSDs after discharge proces**
- **Grid remains stable and available - no interruption to operation**
- **No thermal stress - protection of the infrastructure & longer service life**

3. Leakage Current-Free - Efficient, Durable, Fail-Safe

Classic varistor-based surge protection devices conduct small amounts of current - so-called leakage currents - even in normal operation. These may seem insignificant at first glance, but in the long term they lead to undesirable effects: **Energy losses, internal heating, premature ageing of components** - and in systems with residual current circuit breakers (RCDs), **false tripping**.





VG technology works entirely leakage current-free. In normal operating mode, no current flows through the protective device - the protective path is only activated in the event of a real overvoltage event. This means: **zero energy consumption**, no intrinsic load on the components, no reaction of RCDs - and therefore a significantly longer service life.

At the same time, the internal thermal load is reduced - which not only increases the durability of the SPD itself, but also improves the **stability of the entire electrical system**. In times when efficiency and sustainability are becoming increasingly important, this is real added value - both **technically and ecologically**.

In a nutshell:

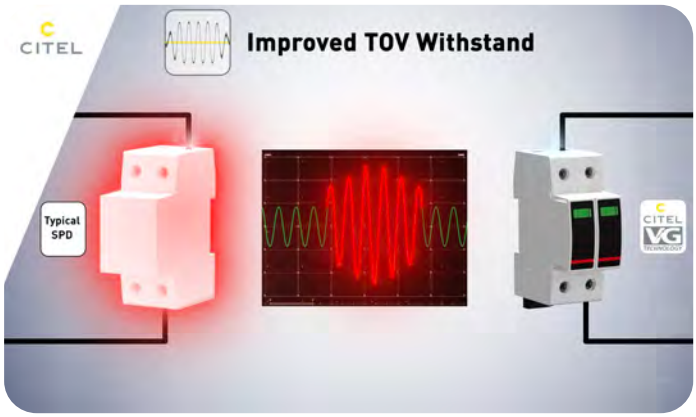
- **No energy consumption in normal operation** - maximised efficiency
- **No heating, no internal ageing** - longer service lifetime
- **RCD-proof** - no unwanted tripping due to I_{PE}

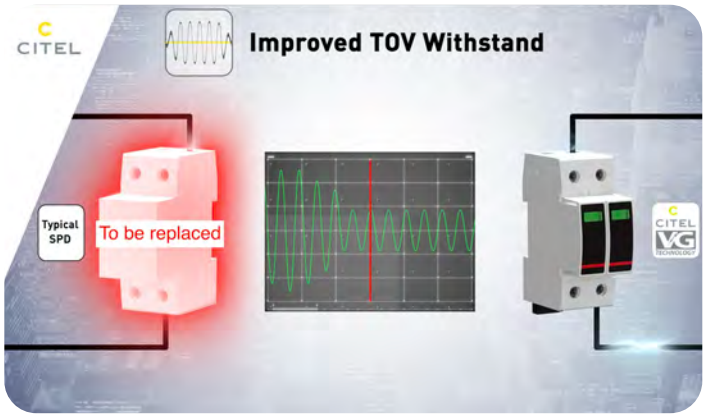
4. Excellent TOV Resistance - Reliable Even in Case of Mains Faults

Temporary overvoltages (TOVs) are often caused by grid faults - such as the loss of a neutral conductor, earth faults or switching operations in the supply grid. These voltages exceed the normal operating level and can **overload or even destroy classic SPDs** - especially those based on MOV.

VG technology is TOV-resistant up to more than 500 Vac - permanently. Even with prolonged overloads, the protective function remains fully intact. No switch-off, no deterioration in performance, no replacement necessary.

This TOV resistance is particularly relevant in industrial environments, in networks with frequent switching operations or in countries with unstable power quality. **VG provides reliable protection even when other solutions have long been abandoned**. This not only saves costs but also ensures uninterrupted operation - a significant advantage in critical applications.





Because VG does **not need to be replaced** even after TOV events, maintenance costs are significantly reduced, resulting in **less downtime and manpower being required, as well as reduced operating costs.**

In a nutshell:

- **Reliable protection in the event of temporary grid overvoltages**
- **No degradation or failures during TOV events**
- **Maximum stability even in unstable grids** - ideal for industry, PV, infrastructure

5. Safe Disconnection - Controlled Switch-off Without Risk

At the end of a surge protective device's service life, it becomes clear whether safety has really been considered. Many classic SPDs - especially those based on MOV - can become critical as they age: due to increasing leakage currents, internal heating or even arcing in the event of a fault. Without reliable isolation, there is a **risk of an internal short circuit or fire** in the worst-case scenario.





VG technology prevents precisely this - thanks to a particularly safe, controlled disconnection. This is achieved by the design with a gas-filled spark gap (GSG), which continues to disconnect safely even if the varistor is only minimally conductive. As a result, the integrated thermal disconnector can trip without load and **without sparking** - clean, controlled, reliable.

This level of safety is not a nice-to-have, but essential - especially in applications where **fire protection, system availability and personal safety** have the highest priority.

And: Because VG does not generate any leakage currents over its entire service life, there is no unnecessary thermal load in the first place.

In a nutshell:

- **Reliable disconnection at the end of service life - without risk of short circuit or arcing**
- **Thermal disconnection without load current - prevents fire scenarios**
- **No uncontrolled ageing - stable protection until the end**

6. Simplified Maintenance Processes - Saves Time, Costs and Nerves

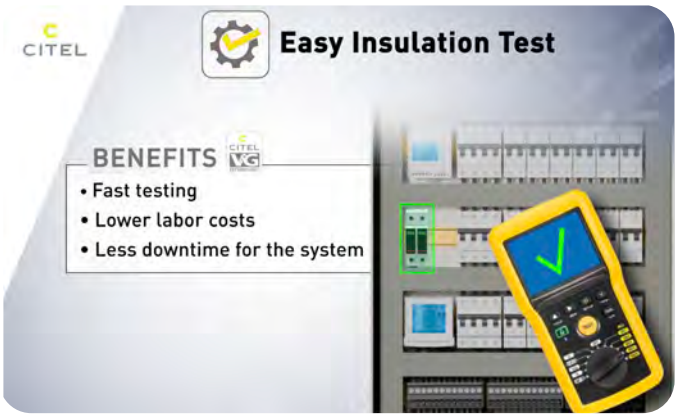
The commissioning of electrical systems requires, among other things, an insulation resistance test - an integral part of many standards and safety specifications. Classic SPDs usually have to be **disconnected or shunted** for this, as their internal structure influences the test resistance or can lead to false tripping. This is timeconsuming, increases the effort involved and is a source of possible faults.

With VG technology, this step is completely eliminated.

Thanks to the leakage current-free design, VG arresters simply remain connected during the insulation measurement - they do **not influence the measured value** and remain absolutely neutral during the test

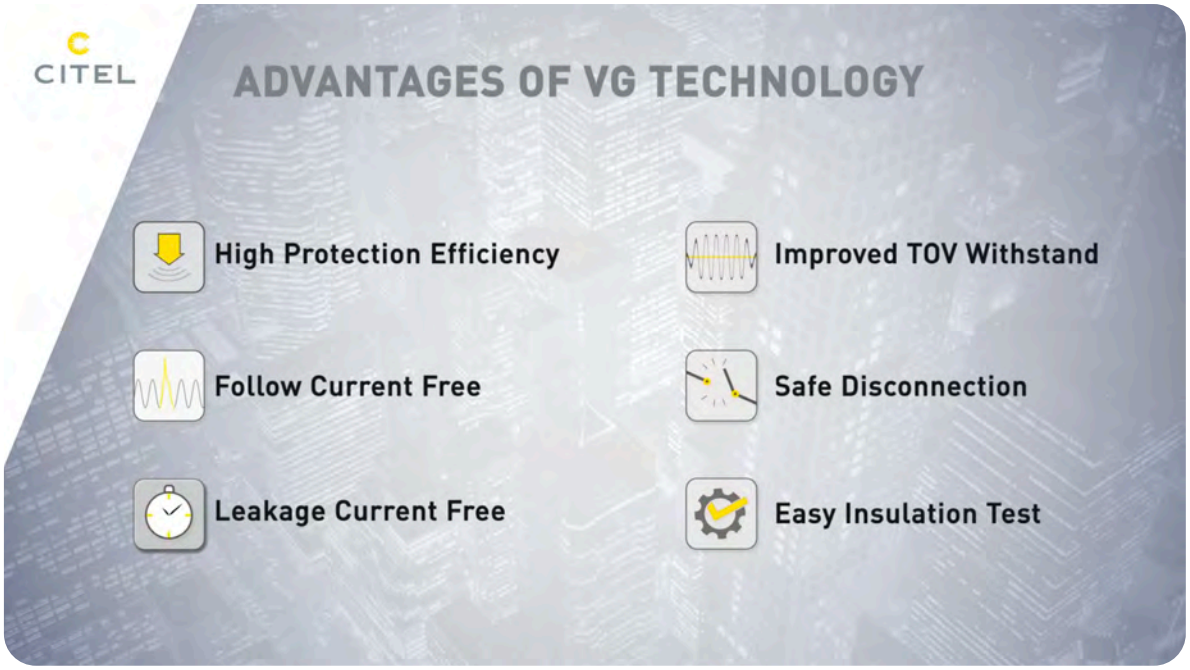
This is a real advantage, especially for larger projects, distributed installations or time-critical commissioning: **faster processes, fewer mistakes, less manpower** required. VG technology is also easy to check, clearly identifiable and - if necessary - quick to replace when maintenance is required.





In a nutshell:

- **No disconnection during insulation tests - saves time & effort**
- **Reduces complexity during commissioning & service**
- **Error reduction due to fewer interventions in the system**


ADVANTAGES OF VG TECHNOLOGY
High Protection Efficiency
Improved TOV Withstand
Follow Current Free
Safe Disconnection
Leakage Current Free
Easy Insulation Test


GSG → GAS - FILLED - SPARK GAP
A UNIQUE CITEL EXPERTISE
A WIDE RANGE
85 YEARS EXPERIENCE
MORE THAN 500 MILLION GDT'S MANUFACTURED


MOV + GSG
(Varistors)
(Gas-filled-Spark Gap)
Disconnection system


High Protection Efficiency
Improved TOV Withstand
Follow Current Free
Safe Disconnection
Leakage Current Free
Easy Insulation Test

CITEL

France

Headquarters
Sales department
Paris
Tel. : +33 1 41 23 50 23
e-mail : export@citel.fr
Web : www.citel.fr

Factory
Reims
Tel. : +33 3 26 85 74 00

Germany

Bochum
Tel. : +49 234 54 72 10
e-mail : info@citel.de
Web : www.citel.de

USA

Miramar
Tel : (954) 430 6310
e-mail : info@citel.us
Web site : www.citel.us

China

Shanghai
Tel. : +86 21 58 12 25 25
e-mail : info@citel.cn
Web : www.citel.cn

India

New Delhi
Tel. : +91 11 2626 12 38
e-mail : indiacitel@gmail.com
Web : www.citel.in

Thailand

Bangkok
Tel. : +66 (0) 2 104 9214
Web : www.citel.fr

UAE

Dubai
e-mail : info@citel.ae
Web : www.citel.fr

Colombia

Bogota
e-mail : export@citel.fr
Web : www.citel.fr

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