

Risk Reduction Measures for LV Switchboards
The Importance of 3rd Party Type Testing

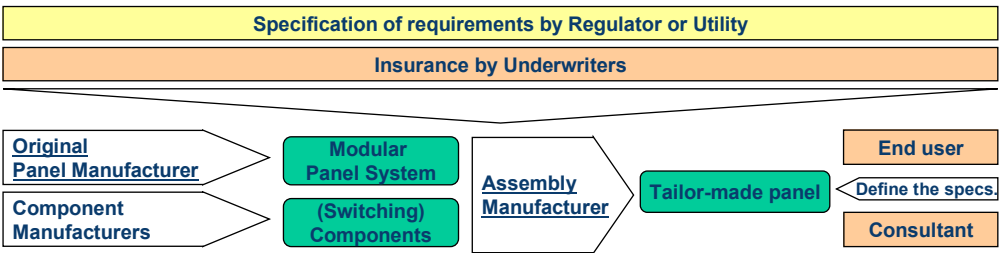


Kasper Nijkamp, Business Development Manager



Roles in the supply chain

A low voltage distribution and control panel is the product of a long supply chain...



...the road from design to customer applications can be full of twists and surprises

Risks associated with unsafe panels

Failures in LV switch- and controlgear can result in:

Loss of energy supply

Fire / Explosions

Personal injury

Impact on
economics & people

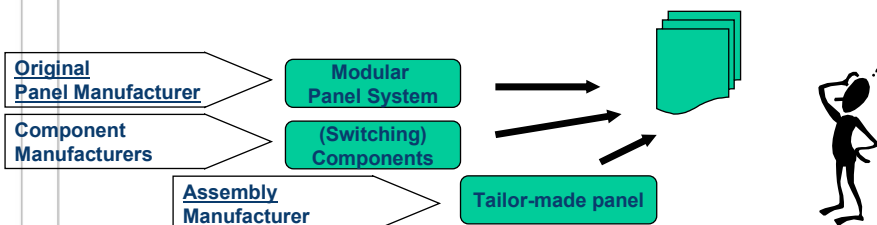
Risk Rating Matrix

		CONSEQUENCE				
		Insignificant	Minor	Moderate	Major	Catastrophic
LIKELIHOOD	Almost Certain	Low	Significant	High	High	High
	Likely	Low	Significant	Significant	High	High
	Possible	Low	Low	Significant	High	High
	Unlikely	Very Low	Low	Significant	Significant	Significant
	Rare	Very Low	Very Low	Low	Low	Significant

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Tailor-made panels, some questions...

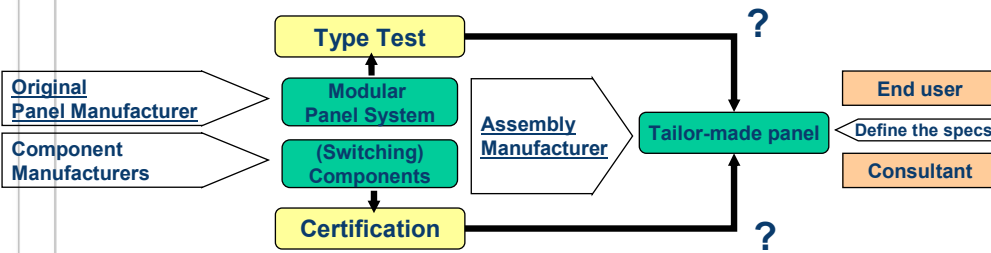
- Have you defined and specified a required safety level?
- Does the safety level incorporated in the LV panel under your responsibility meet the safety level you find acceptable?
- Do you have the specific knowledge and resources to evaluate all test reports, certificates and other documentation presented?



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Tailor-made panels, some questions...

- Is the tailor-made panel covered by the type test conducted on the original panel system (reference design) or are there any significant modifications?



- Are all the important switching components certified?

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Which deviations could significantly affect the performance?

- Major structural changes to the assembly carcass;
- Reductions in busbar cross-sections, changes in busbar profiles and spacing;
- Changes to type or quantity of busbar supports or the support structures;
- Exclusion of or changes to major short-circuit protective devices or load switches;

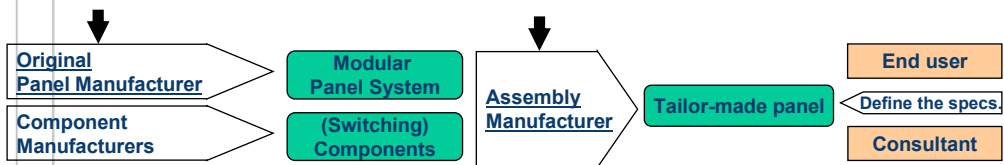


Reduction in compartment sizes or ventilation.

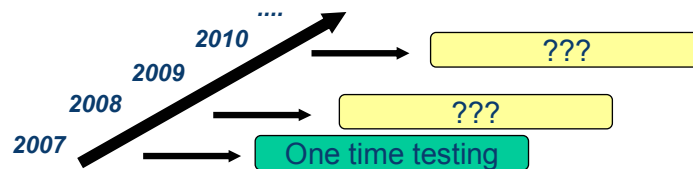
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Tailor-made panels, some questions...

- Is the testing and certification only product focused or are quality system aspects incorporated?



- Is there a continuous monitoring of conformity or is it based on a single assessment only?



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One thing is for sure...

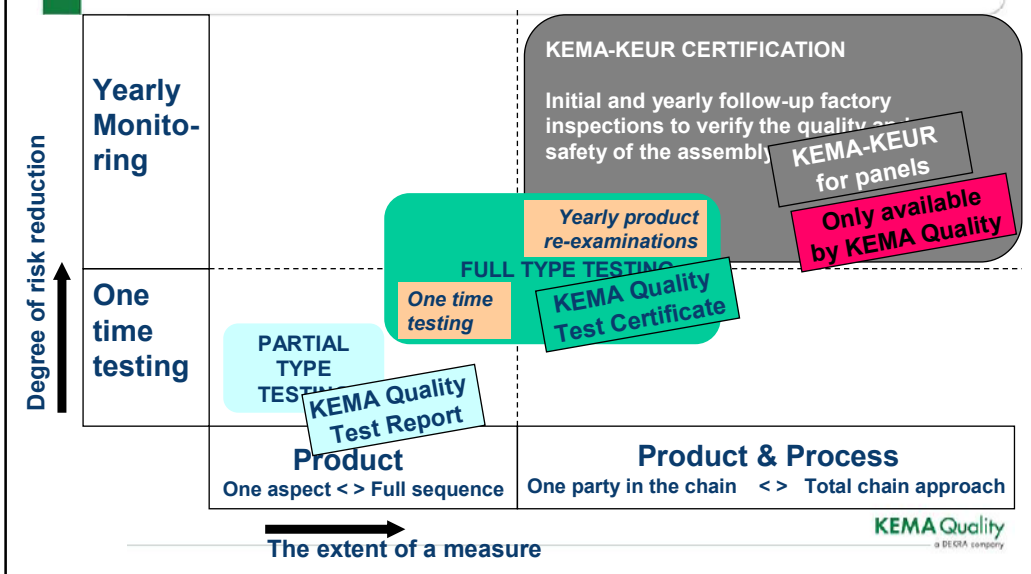
- All parties involved want to avoid unsafe tailor made panels.
- It is a question of choosing the right measure at the beginning in order to control the risks.
 - It is the end-user / consultant's responsibility to assess the applicable risk level.
 - It is the panel builder's responsibility do deliver a product that meets or exceeds his clients explicit and implied needs.
 - It is our job, as a 3rd party testing and certification company, to offer useful measures to control it.

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Risk Reduction Measures available in the market

- **Partially type testing** on one or several product aspects (e.g. IP, temperature rise, short circuit).
- **Full type testing** to a sequence of tests, described in detail in a standard.
- **Full type testing + certification** including verification of the quality process and yearly product re-examinations and yearly factory inspections.

Risk Reduction framework LV Switchgear Assemblies



Key issues we face today

- **No 3rd party verification of local assembly/manufacturing process according international procedures**
 - adequate facilities, equipment and building
 - qualification of personnel
 - adequate working procedures
- **Actual panels are not covered by the type test certificates**
 - panel is tested to bare minimum, incoming and outgoing units are not part of the type test
 - changes in the design that significantly affect the performance (short circuit behavior, temperature rise behavior)

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Importance of factory inspections!!

Issues we face today during factory inspections

- Exchange of components
- Same person is assembling and testing the product
- Limited knowlegde how to use test equipment
- No seggregation of non conforming components
- No clear test instructions
- Modifications on construction of panel

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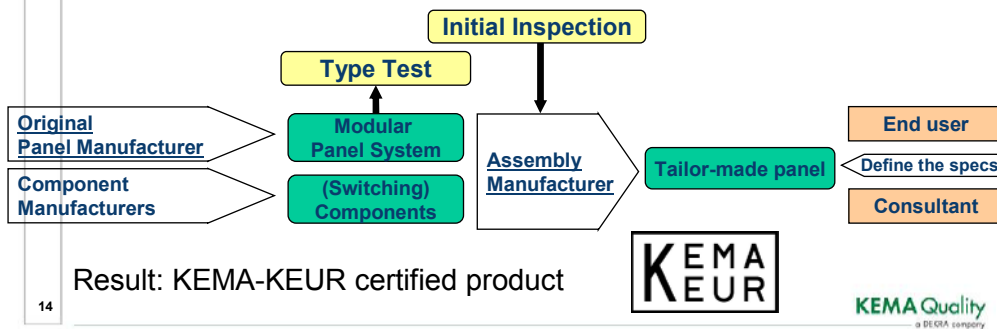
Surplus value of KEMA-KEUR certification for panels

- **Combination of technical product aspects and quality process requirements;**
 - We will verify if the manufacturing location is equipped in order to make the specific product and if quality control measures are available.
- **Continuous monitoring instead of one time testing of a (golden) sample**
 - Periodic product re-examinations to assess if the product is still the same as the type tested sample.
 - Yearly inspection of the manufacturing location in order to determine whether or not it still is capable of manufacturing the specific product.

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Procedure KEMA-KEUR for panels (1)

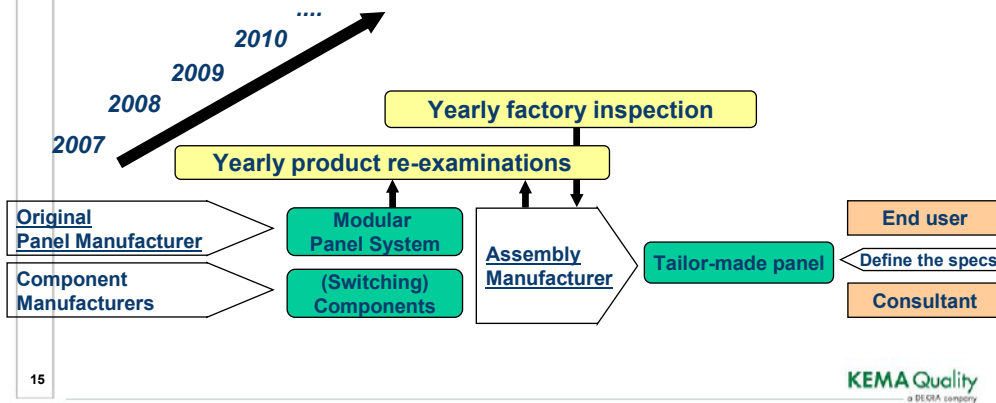
1. Full type test by KEMA against EN/IEC 61439-2.
2. Initial inspection of the assembly manufacturer regarding quality system and assembly by KEMA staff, again according to CENELEC procedures.



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Procedure KEMA-KEUR for panels (2)

Yearly product re-examinations and factory inspections by KEMA staff.



And after choosing the right measure...

Choose the right testing and certification company!

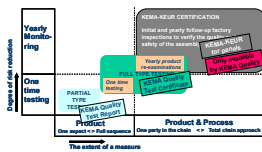
- Is your T&C company close to the source and represented in all the important technical committees?
- Does your T&C company witness testing! Do they work with the same high-qualified and experienced staff around the globe?
- Does your T&C company have the same interpretation everywhere based on the latest information and knowledge?
- Do they offer a full range of services: from type testing up to certification measures for low voltage switchgear?

The added value of KEMA Quality...

All over the world:

- Tests witnessed by KEMA Quality staff
- The same interpretation of standards
- The same quality level
- The same recognition by other stakeholders
- Full range of services for LV switchgear

KEMA Quality policy



→ High score on trust and acceptance of your products

The KEMA Quality Risk Reduction Building



The four floors of the building cover the various KEMA Quality service levels

Risk Reduction Levels



- Level 1 – Product Aspect Focus on part(s) of a product or part(s) of a standard; partial testing
- Level 2 – Product Type Focus on the complete product; full type testing
- Level 3 – Product Lifetime Focus on the complete product + annual follow-up; certification
- Level 4 – Product Network Focus on the supply chain; custom designed testing & certification

