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OUR EXPERIENCE TO FULFIL YOUR POWERTRAIN
VALIDATION REQUIREMENTS

Walter Vinciotti CEO & Founder

Since 2010 your partner for electric powertrains development and **validation**

Which tests can we cover



Climatic and Endurance

These tests are made to simulate rapid temperature shifts due to transportations. Thanks to accurate accumulation of damage algorithms they can be useful to predict the behavior of the system after several cycles of usage. They can be done with the system power on or off, with humidity or not.



Mechanical Stresses

With the aim of validating the connection between subcomponents, resistance of supports, welding or electronic parts they are usually divided in 3 main categories: random or sinusoidal vibration, shock and drop test. Most of them are regulated under the UN38.3, standard for marine, air and wheel transportation.



Solid/Fluid Intrusion

They can be divided in 4 different areas: dust intrusion, water or steam intrusion, Salt water or fog immersion, chemical exposure. These testes are made to provide an accurate forecast of the effect of corrosion, validate the sealing or predict the behavior of components in contact with certain type of fluids.



Safety and Missuse

They are usually tailored on the application of the component under test. They can simulate an extreme loading condition, mechanical or electrical. Examples are overspeed or overtemperature for electric motors, internal short circuits, over charge or over discharge for batteries.

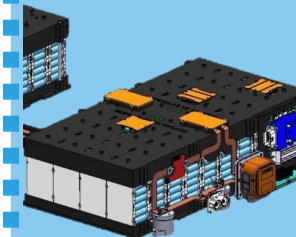
On which components

We had an extensive experience on different powertrains of different sizes.



Power Unit:

External case with cooling system
Electric machine
Inverter
CAN Gateway
Microgateway
Power circuit components
Up To: 125kg Dimensions:
620x485x490 [mm]



Battery

With our without cooling system
Distributed BMS with master and slaves architecture
With external case or sub-modules
Up to: 220kg Dimensions:
1678x803x310 [mm]



Integrated Systems

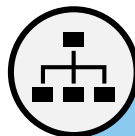
E-motor
Inverter
Battery Pack
Charger

Our Workflow

Our first goal is to ensure that the goals of the customer are met in terms of safety, performance or market accessibility. This involves a first study of the regulations and of the product possible applications in order to tailor the most effective test plan.



Mandatory regulation knowledge and analysis of the applications of the components in the market



Preliminary definition of the testing plan, with number and type of test, facilities, equipment and budget forecast

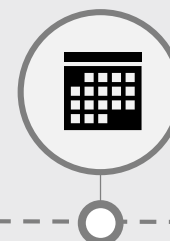


Formal requests of offer sent to testing labs, optimization of the testing plan in terms of schedule and budget. Final plan ready.

Who works with us



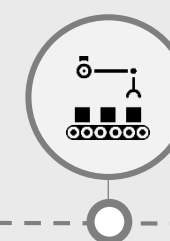
The final report is issued



Continuous monitoring and intermediate reporting.



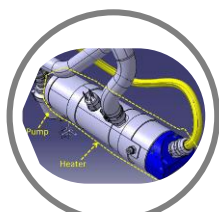
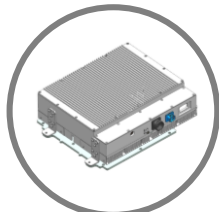
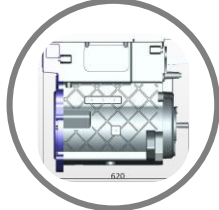
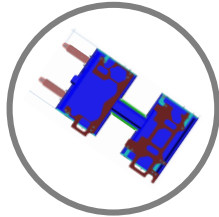
Start of testing activities.



Manufacturing of supports, purchase of extra equipment.

Case Study – Electric Commercial Vehicle

For an important customer based in Turin and Termini Imerese we developed an extensive DV Plan aimed to ensure the reliability of the electric powertrain system during the entire life span of the vehicle. The plan involved several components such as the battery pack, the power unit, the charger and the cabin heater.

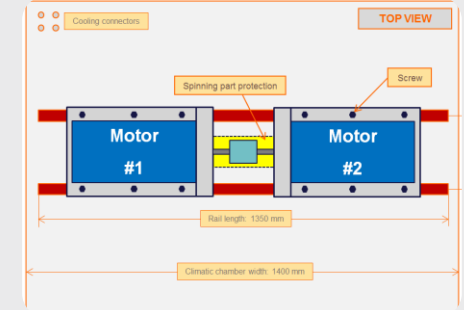


Test Parameters for the Sinusoidal Component of the Vibration			
	Frequency [Hz]	Amplitude of acceleration [m/s^2]	Amplitude of acceleration [G]
Sinusoidal Vibration Profile for Class V1A	100	30.0	3.06
	200	60.0	6.12
	400	60.0	6.12
	440	60.0	6.12
Sweep Rate (Sinusoidal Vibration)	1 octave / minute		
Test Parameters for the Random Component of the Vibration			
	Frequency [Hz]	Power spectral density (PSD) [$(m/s^2)^2/Hz$]	Power spectral density (PSD) [G^2/Hz]
Random Vibration profile for Class V1A	10	10.0	0.104
	100	10.0	0.104
	300	0.51	0.0053
	500	5.0	0.052
	2 000	5.0	0.052
	RMS acceleration	96.6 m/s^2	9.85 G
Acceptance Criteria	Performs as designed during and after the test. Meets all functional requirements before & after the test. No damage/BSR, no functional or performance degradation, no undesired or intermittent operations shall be allowed. Part shall not have any signs of physical deformation, burn marks, etc.		

Analysis of the regulations provided by the customer and adaptation of such test to the specific application of the vehicle.

For this customer it was necessary to rethink most of the test parameters and cycles that were initially designed for internal combustion engines applications.

The plan has been drafted putting the attention on 4 different types of test. Thermal Endurance, Mechanical Stresses, Fluid Intrusion, Safety and Miss-use. The planning required the management of different stake holders such as the customer, the suppliers and the testing lab as well as a relevant logistic organization to provide component and equipment according to the plan.



The power unit test required the arrangement of specific testing configurations. This involved the design of special mechanical equipment, electronic benches and coding new software. Once the equipment were manufactured and the testing facilities booked we were able to provide the final DV Plan.

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