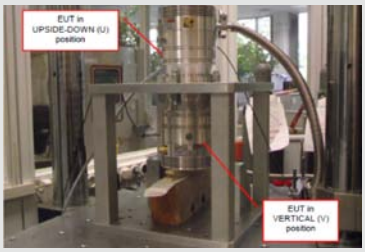
AGILENT TWISTORR 304 FS
HIGH PERFORMANCE, INNOVATION, RELIABILITY.

Agilent commitment to technology leadership translates into quality, reliability and performance.
Our products need to comply with strict parameters, to make sure we can meet and exceed customer expectations.
The TwisTorr 304 FS represents a breakthrough in turbomolecular pump technology, based on two patented innovations, TwisTorr stages and Floating Suspension, which strongly impact performance and reliability.
Development of the 304 FS included a comprehensive series of tests and analysis, performed to ensure the highest levels of pump performance and reliability. Through those tests VPD verified, step by step, that pump performance and robustness is ready to meet our customers' demanding specifications.

This rigorous test regime of product performance, reliability and durability according to Agilent standards ensures the release of a robust, high performance, system compatible product.

TwisTorr 304 FS Test Elements



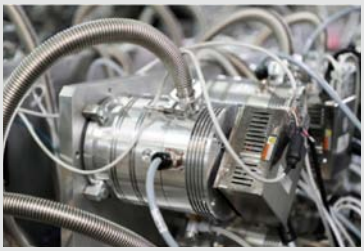
Shock Test


Vibration Test


Temperature Test


Noise Test


Reliability assessment on Agilent system


Life Tests


Vacuum Test


Humidity Test

Agilent Technologies

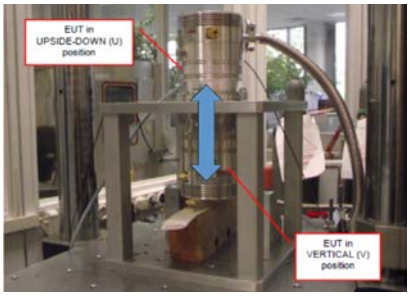
Shock Test

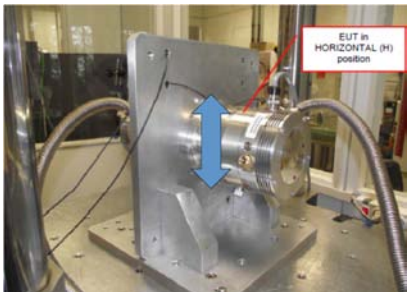
4 Pumps tested in each position.

Pump position	Sinusoidal (Operative)	Trapezoidal (Non-Operative)
Horizontal	> 110g	> 40g
Vertical	> 150g	> 60g
Upside-down	> 150g	> 60g

Operative: Pump tested under nominal working conditions (pump ON). After the test the pump must operate as new.

Non Operative: Pump not running (pump OFF) to simulate transportation and storage. The pump after the test must operate as new.





Vibration Test

4 Pumps tested in horizontal, vertical and upside position.

Pump position	Operative (5-500Hz)	Non-Operative (5-500Hz)
Horizontal	0.2grms	2grms
Vertical	0.2grms	2grms
Upside-down	0.2grms	2grms

Operative: Pump tested under nominal working conditions (pump ON). After the test the pump must operate as new.

Non Operative: Pump not running (pump OFF) to simulate transportation and storage. The pump after the test must operate as new.

Temperature Test

4 Pumps tested in horizontal, vertical and upside position.

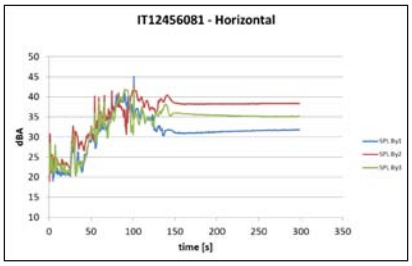
Pump position	Operative	Non-Operative
Horizontal	0 °C to 40 °C	-40 °C to +70 °C
Vertical	0 °C to 40 °C	-40 °C to +70 °C
Entire thermal cycle = 80 hours		

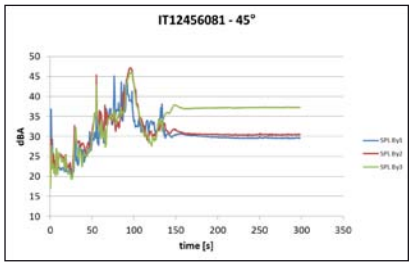
Operative: Pump tested under nominal working conditions (pump ON). After the test the pump must operate as new.

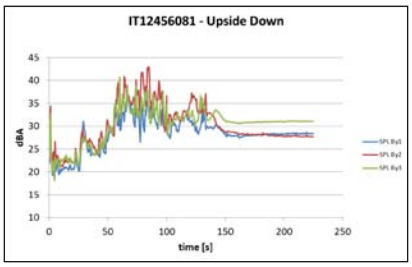
Non Operative: Pump not running (pump OFF) to simulate transportation and storage. The pump after the test must operate as new.

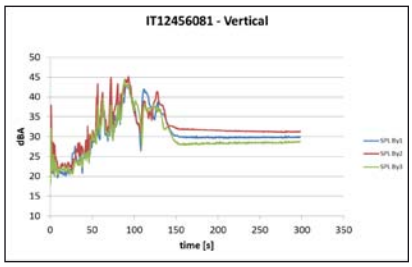
Noise Test

Noise specs are measured at full speed at 1 meter from the pump (noise specs < 50dB (A)).





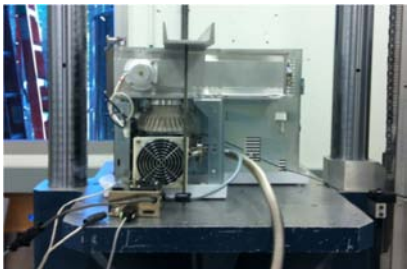


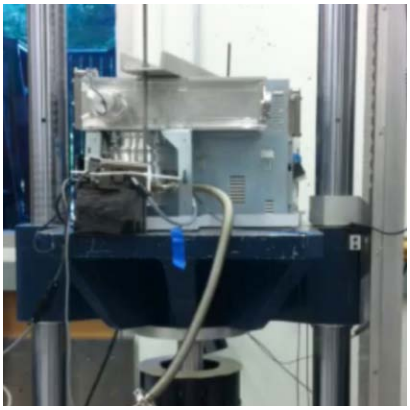


Reliability assessment on Agilent GCMS

Non-operational shock test: system drop with pump not running, after each drop pump is switched on and after stabilization unbalance, Fourier spectra, power adsorption and bearing temperature are acquired.

# shock	1	2	3	4
TV301 IT12186116	pass	pass	pass	pass
TV301 IT12196067	pass	pass	pass	pass
TV301 IT12166229	pass	pass	pass	fail
304 - LP 13	pass	pass	pass	pass
304 - LP 15	pass	pass	pass	pass
304 - LP 16	pass	pass	pass	pass
304 - LP 14	pass	pass	pass	pass





Operational shock test: system drop with pump running, after each drop unbalance, Fourier spectra, power adsorption and bearing temperature are acquired.

Increasing drop height

# shock	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	...	25
Height (inches)	3	3	3	3	3	3	3	3	3	3	3.1	3.2	3.3	3.4	3.6	3.8	4	4.3	...	10
TV301 IT12186116	crash																			
TV301 IT12196067	crash																			
TV301 IT12166229	crash																			
304 - LP 13	pass	pass	pass	pass	crash															
304 - LP 15	pass	crash																		
304 - LP 16	pass	Pump perfectly working but unbalance above baseline																		
304 - LP 14	pass	Pump perfectly working but unbalance above baseline																crash		

Pass = Unbalance within baseline value