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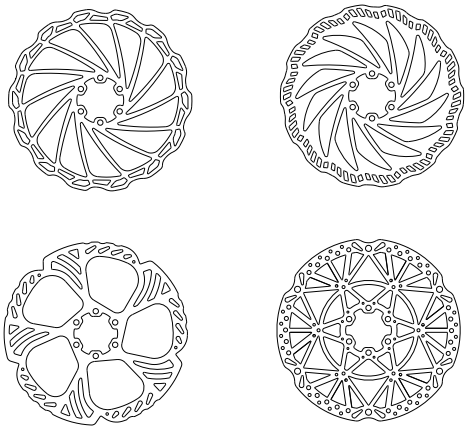
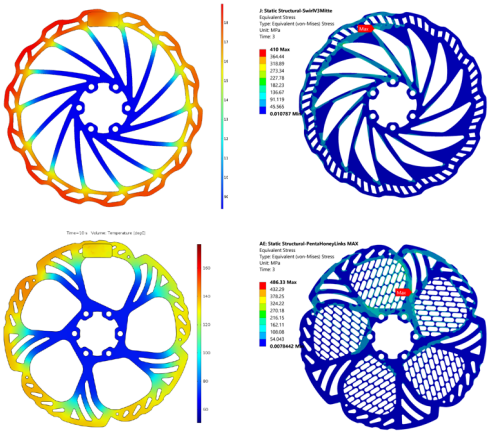
TECH INFO

SwissStop

CATALYST DISC ROTOR | RESEARCH AND DEVELOPMENT





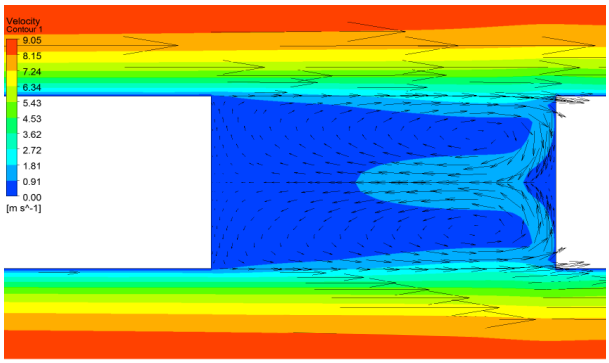
1. DESIGN AND MODELLING

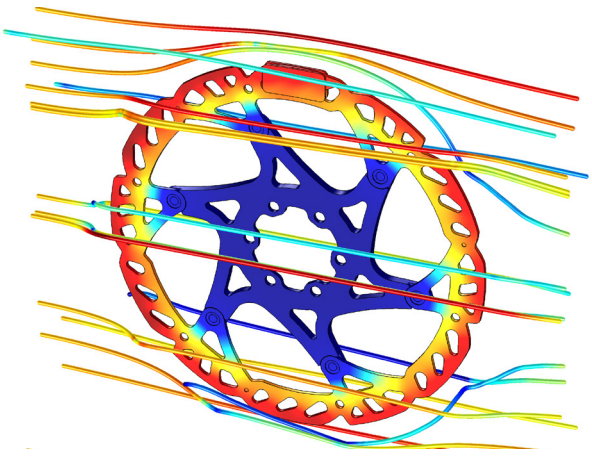
In early 2015, the SwissStop engineering team conducted a series of laboratory tests on bicycle brake disc rotors. Next, they created digital models of these rotors and simulated the same test environments using advanced software. A comparison of the data verified that the simulations were accurate and effective, giving the engineers confidence to proceed with creating an array of digital prototypes to thoroughly test and evaluate.

2. HEAT AND STRUCTURE SIMULATIONS

Heat transfer within the design concepts was studied extensively using engineering simulation software. The relationships between convection, radiation, surface area and weight were used to determine the optimal design to maximize heat dissipation and strength while minimizing weight.

The structure of each design was evaluated under braking forces ranging from typical hand pressure up to theoretical maximums. Critical pressure points in the structure were identified in order to maximize the strength and stiffness of the rotor.





3. AIRFLOW ANALYSIS

Computational fluid dynamics (CFD) simulations were peformed to study airflow over the surface of the rotor and through the cut-outs. A variety of profiles were tested to determine the effects of asymetrical holes and optimize the cooling effect of airflow over the surfaces.

4. FINAL DESIGN

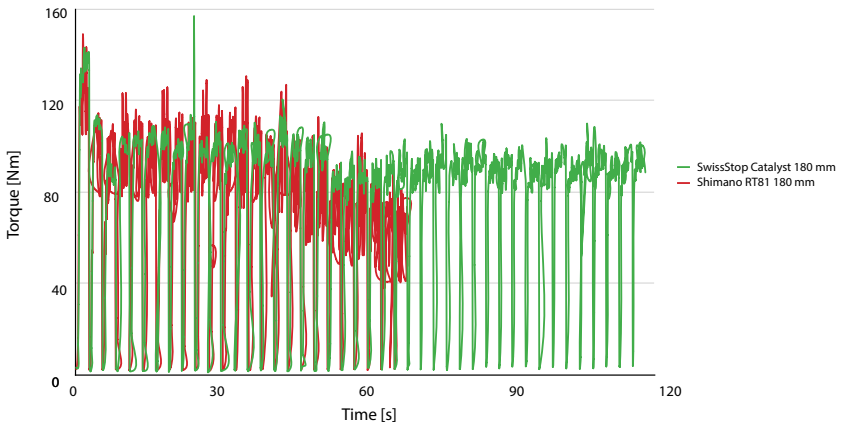
The final design was confirmed and visualized with further thermal and structural simulations.

A two piece design consisting of a 7075T6 aluminum alloy spider and SUS410 stainless steel brake track was chosen to balance light weight with reliable thermal management and structural performance.

Vibrations are minimized by the geometry of the brake pad contact area.

CATALYST DISC ROTOR | PERFORMANCE AND SPECIFICATIONS

Endurance Test: Torque



Rotor thickness by model

Ø 140mm 1.85mm

Ø 160mm 1.80mm

Ø 180mm 1.80mm

Ø 203mm 1.85mm

Laboratory testing of the Catalyst disc rotor confirmed the results of the engineering simulations.

The Catalyst excels in endurance testing - delivering consistent brake torque over time while standard brake systems gradually decline and eventually suffer structural failure.

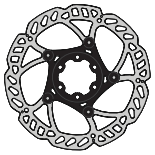
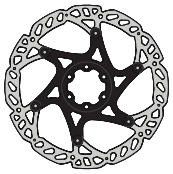
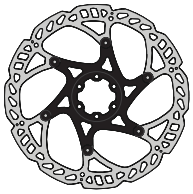
Further tests demonstrated extremely efficient thermal management, notably shorter stopping distances, very low wear rates and structural integrity under hard braking exceeding the current industry leaders.

Practical testing of the prototypes allowed the development team to determine the optimum balance between two of the primary, yet competing, characteristics: brake performance and weight.

A carefully chosen few extra grams of material added to the outer ring translated directly into shorter stopping distances.

Engineers selectively added material to specific sizes to further improve performance and durability.

Compatible with all sintered and organic pad compounds. Optimized for SwissStop EXOTherm.

	Rotor	Braking Force Dry (N)	Temperature (C)	Braking Force Wet (N)	60 km/h to stop Dry 90 N (m)	60 km/h to stop Wet 90 N (m)	Consumption (%)	Rotor Weight (g)
	Catalyst 140mm	722	126	616	56	47	1	110
	Shimano RT 81 140mm	645	177	408	113	120	6	98
	Catalyst 160mm	824	184	702	52	44	1	128
	Shimano RT 81 160mm	838	136	637	52	81	10	120
	Catalyst 180mm	964	171	785	44	44	1	156
	Shimano RT 81 180mm	925	168	837	50	57	11	140
	Catalyst 203mm	1091	166	830	40	42	1	198
	Shimano RT 81 203mm	902	182	342	56	57	11	170