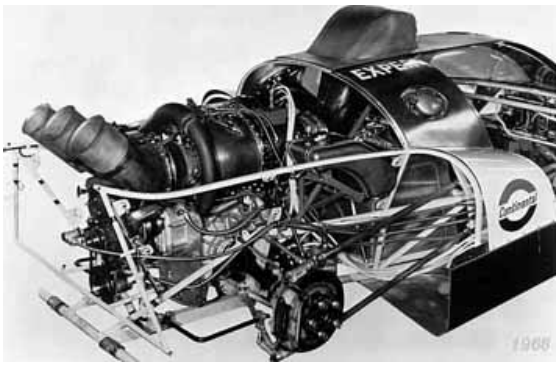
The history of the Howmet TX turbine car of 1968, still the world's only turbine powered race winner

The 1960s was a time when there were many fewer restrictions placed on race car designers than today, and that period saw the appearance of gas turbine powered cars, such as Andy Granatelli's STP-Paxton and Lotus 56 cars and the American Howmet Corporation's TX sports-racing machine of 1968.

The Howmet project was conceived early in 1967 by Ray Heppenstall, a sports car racer from Philadelphia and one of his racing friends, Tom Fleming, then sales vice-president of Howmet, one of the United States' leading metal companies and a major supplier of precision castings to the aircraft gas-turbine industry. They reckoned that a suitable lightweight turbine mounted in the back of a conventional sports-racing chassis would be a competitive proposition and convinced the Howmet board that running a race-car program would be an ideal promotional tool.

Heppenstall found a suitable power unit at Continental Aviation & Engineering, who had recently lost out in a bid for a US government contract for a light observation helicopter engine and had ten TS325-1 turboshaft engines left on the shelf from its development work. This unit developed a nominal 325 bhp at the output shaft, 650 lbs. ft. of torque at stall, and weighed 170 lbs. Applying the FIA's engine equivalency formula it was rated at 2960cc, slotting it neatly into the Group 6 sports-prototype three litre class. Continental contributed two of these engines for installation in a relatively conventional tubular space-frame chassis built by Bob McKee.



The turbine was mounted at the rear, above a single speed transmission driving the rear wheels through a specially designed quick-change differential which allowed ratio changes. The necessary reverse was provided by a separate electric motor drive. A 32 gallon fuel tank was mounted centrally between the cockpit and the engine. Suspension was by conventional wishbone and coil spring/shock absorber units, with outboard disc brakes.

The TS325 engine comprised a two-stage gas generating turbine driving the two-stage compressor while also providing gas to the power turbine whose output shaft, via reduction gearing, drove the rear wheels. Heppenstall's solution to the turbine lag was to insert a wastegate between the gas-generating and the power turbines. The first third of throttle pedal movement controlled fuel supply to the combustion chambers, and thus the speed of the engine. But once spinning at its maximum 57,500 rpm and delivering full power, the final two-thirds throttle movement activated the wastegate, thus controlling the amount of gas directed to the power turbine, and hence the rear wheels.

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The 1968 Racing Season

The TX's first race was the Daytona 24 hours in February and two cars were brought, a newer car with 2.25 inch longer chassis and the original; drivers were Dick Thompson, Ed Lowther, and Heppenstall. After practice problems with the new car, the older one was prepared and raced. After 34 laps, and running as high as third, the wastegate valve stayed shut as Lowther arrived at a tight corner leading from the infield to the banking, the resultant contact with the wall putting the car out.

At the Sebring 12 hours the car was qualified third, just 1.2 seconds adrift of the pole. In the race, the TX was running seventh when one of the engine mountings broke, and retired just before the seventh hour.

At the BOAC 500 at Brands Hatch in April British pilot Hugh Dibley joined Thompson and the TX qualified seventh. In the race the wastegate problems struck again, sending Thompson into the bank at Druids after seven laps. Dibley then drove in the Guards Spring Cup at Oulton Park the following weekend. Here he qualified second, and was running in fourth place until he pitted for fuel, but the starter failed and there was no way he could rejoin.

Heppenstall then campaigned the cars in a number of SCCA regional events. The first race finish came in May in the Cumberland 200. Then on June 8th Heppenstall won the qualifier for the Heart of Dixie race at Huntsville, and then the main race the following day, the first race win for a turbine powered car. The following weekend at Marlboro, Dick Thompson joined him for the 4½ hour 300 mile race. Thompson won the qualifier, then the following day with Heppenstall the feature race also, leading from start to finish.

Marlboro 1968 *(Photo by kind permission of Roy Des Ruisseaux)*

The Watkins Glen 6 hours in July was the next FIA Championship outing, and for the first time both TX's were raced, with Thompson/Heppenstall being joined by Hugh Dibley/Bob Tullius. The cars qualified 8th and 9th, and were running well in third and fourth places, until the final hour. Heppenstall and Thompson maintained third spot until the end, but the transmission of the Dibley/Tullius car broke, although they managed to cross the finish line and be classified 12th.

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The Le Mans 24 hours on 28th/29th September turned out to be something of a disaster. After only three laps Thompson came back in to hand over to Heppenstall, feeling that his car wasn't quite right. A fuel system problem limited the engine to 70% power and strangled the speed on the straight. They kept going however, and had worked up to 29th place when, at 9.45pm, Thompson crashed at Indianapolis corner and rolled, severely damaging the car although being unhurt himself. A rear wheel bearing broke on the Tullius/Dibley car after less than two hours. Although repaired in a lengthy three-hour rebuild, it was finally disqualified in the seventh hour having covered insufficient distance.

Le Mans marked the final race appearance of the unique TX's, Howmet choosing not continue with a race program in 1969.

1968 Race Results

3/4 February	**Daytona**	**24 Hours**	**FIA Championship**	
race # 76	chassis #1	white/blue	Ray Heppenstall/ Dick Thompson/ Ed Lowther	retired
23 March	**Sebring**	**12 Hours**	**FIA Championship**	
race # 76	chassis #1	white/blue	Dick Thompson/ Ed Lowther/Ray Heppenstall	retired
7 April	**Brands Hatch**	**BOAC 500 (6 hours)**	**FIA Championship**	
race # 35	chassis #1	white/blue	Dick Thompson/Hugh Dibley	retired
12 April	**Oulton Park**	**Guards Spring Cup (100 miles)**		
race # 68	chassis #1	white/blue	Hugh Dibley	retired
11/12 May	**Cumberland, West Virginia**	**Vandagrift Trophy (200 miles)**	**SCCA**	
race # 76	chassis #1	white/red	Ray Heppenstall	2nd, new lap record
2 June	**Grattan, Michigan**	**100 miles**	**SCCA**	
race # 76	chassis #1	white/red	Ray Heppenstall	retired
8 June	**Huntsville, Alabama**	**Heart of Dixie Qualifier**	**SCCA**	
race # 76	chassis #1	white/red	Ray Heppenstall	1st
9 June	**Huntsville, Alabama**	**Heart of Dixie (57.5 miles)**	**SCCA**	
race # 76	chassis #1	white/red	Ray Heppenstall	1st , new lap record
15 June	**Marlboro, Maryland**	**Marlboro 300 Qualifier**	**SCCA**	
race # 76	chassis #2	white/blue	Dick Thompson	1st
16 June	**Marlboro, Maryland**	**Marlboro 300**	**SCCA**	
race # 76	chassis #2	white/blue	Dick Thompson/ Ray Heppenstall	1st, new race record
13/14 July	**Watkins Glen**	**6 Hours**	**FIA Championship**	
race # 67	chassis #1	white/red	Hugh Dibley/Bob Tullius	12th
race # 76	chassis #2	white/blue	Dick Thompson/ Ray Heppenstall	3rd
10 August	**Donnybrooke, Minnesota**	**Qualifier**	**SCCA**	
race # 76	chassis #2	white/blue	Ray Heppenstall	2nd
11 August	**Donnybrooke, Minnesota**		**SCCA**	
race # 76	chassis #2	white/blue	Ray Heppenstall	3rd
28/29 September	**Le Mans**	**24 Hours**	**FIA Championship**	
race # 22	chassis #2	white/blue	Dick Thompson/Ray Heppenstall	Retired
race # 23	chassis #1	white/blue	Hugh Dibley/Bob Tullius	Disqualified

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Record Breaking

The cars were however retained for further promotional purposes. Ray Heppenstall rebuilt the newer car (chassis #2, which had been rolled at Le Mans) with open bodywork as the TX Mk II, and in August 1970 used it to set six new FIA speed records for turbine cars on a stretch of road adjacent to the Talladega Speedway in Alabama.

Class 2 (cars over 500 Kg and upto 1000 Kg)

Standing Start ¼ mile - 11.83 sec. 122.41 kph (76.07 mph)

Standing Start ½ Km - 13.48 sec. 133.53 kph (82.97 mph)

Standing Start 1 Km - 21.18 sec. 167.97 kph (105.61 mph)

Class 3 (cars over 1000 Kg)

Standing Start ¼ mile - 13.87 sec. 104.41 kph (64.88 mph)

Standing Start ½ Km - 15.74 sec. 114.35 kph (71.05 mph)

Standing Start 1 Km - 23.92 sec. 150.50 kph (93.51 mph)

The following year Howmet sold the two cars, a coupe and the Mk.II Spyder, to Heppenstall for a nominal one dollar, although the engines had to be returned to Continental.

The original coupe (#1), with dummy Continental engine, was owned for many years by collector Jim Brucker in California, but in 2006 was bought by Bruce Linsmeyer (www.avonaero.com) of Indiana and has been restored with a fully working Continental engine. The Mk. II Spyder (#2), less engine and transaxle, eventually found its way into the hands of enthusiast and collector Chuck Haines who entrusted the restoration to Bob McKee in Lake Zurich, Ill. With the original turbines no longer available, secondhand Allison 250C18 turboshaft helicopter units were obtained, providing a similar power output and weighing around 20 lbs. less. This car, restored as a coupe, was shown in public for the first time at the Elkhart Lake meeting in July 1996, and has also appeared at the Goodwood Festival of Speed. (McKee has since also built up another two coupes with Allison engines.)

In 2005 Haines sold (#2) to Xavier Micheron in France. Micheron added a wastegate to the Allison engine, removing the turbine lag and improving drivability. #2 first appeared in this form at the 2008 Le Mans Classic, and is now part of the RofGo Collection.

Ray Heppenstall
1931 – 2004

Thanks to Bob McKee, Ray Heppenstall, Walt Haegele, Hugh Dibley, Bob Tullius, Bob Koch (Continental), Chuck Haines, Mike Bell (Howmet), the International Motor Racing Research Centre at Watkins Glen, and everyone else who has provided information relating to the TX.

Pete Stowe, 2021

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Wanted - If anyone has any reminiscences from seeing the car in 1968 I'd be interested in hearing from them; and also of any photos of car in 1968, especially from the SCCA races in the USA, in particular from Grattan, Michigan on 2nd June and Donnybrooke/Brainerd on 10/11th August - please email me at petestowe @ talktalk.net

Webpage
https://bpmc.org.uk/petestowe/HowmetTX.htm

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