



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 Indianapolis 500 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. Fleming and Heppenstall 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 loaned two of these engines for installation in a relatively conventional tubular space-frame chassis, built by Bob McKee, and clothed with aluminium coupe bodywork.



The turbine was mounted at the rear above a single-speed McKee transmission driving the rear wheels, with Halibrand quick-change gear units allowing 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 single-stage power turbine, whose output shaft, via reduction gearing, provided power to 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.

Specification

Chassis:

Overall length – 158 inches. Width – 69 inches. Height – 37 inches. Wheelbase – 93 inches.
Front track – 57 inches. Rear track – 55 inches. Weight (dry) – 1430 lbs.

Engine: Continental TS325-1 (Military designation T65-T-1) free turbine turboshaft.

Single-stage axial compressor, single-stage centrifugal compressor, single annular combustion chamber,
two-stage axial flow gas generator turbine, single-stage axial flow power turbine.

Length – 39.17 in. Width - 17.9 in. Height - 19.85 in.

Transmission: One forward speed; neutral; reverse (electric).

The first TX was completed by the autumn of 1967, and taken to Road America, Wisconsin, for a shake-down test. Its first public appearance was on the Howmet Corporation stand at the Detroit Automobile Show late in November.

Towards the end of December, the TX was taken to Daytona Speedway for testing on the road course, and for Heppenstall to make a speed record attempt on the banked tri-oval. On 20th December he recorded a 170.056 mph average, to better the previous “closed course wheel-driven turbine record” of Parnelli Jones in qualifying the STP-Paxton turbine for the 1967 Indianapolis 500 at 166.075 mph.

The 1968 Racing Season

Supplementing Howmet’s funding of the TX, considerable sponsorship was also provided by the Pure Oil Company. When raced in the USA the TX appeared with race number 76, in deference to the Union 76 fuel brand of Pure’s parent company, Union Oil.

The TX’s first race was the Daytona 24 hours in February and two cars were brought, a brand-new car (TX-2) with 2.25 inch longer chassis, and the original, TX-1; drivers were Dick Thompson, Ed Lowther, and Heppenstall. After practice problems with the new car, the older TX-1 was prepared and raced. After 34 laps, and having run as high as third, the engine’s 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.

In March at Sebring the car was qualified third for the 12-hour race, just 1.2 seconds adrift of the pole-winning Porsche 907. In the race, the TX was running seventh when one of the engine mountings broke, and was retired just before the seventh hour.

At the BOAC 500 at Brands Hatch in April British airline pilot Hugh Dibley joined Thompson, and the TX qualified seventh. In the race a throttle linkage problem caused the wastegate to stick again, sending Thompson into the bank at Druids Bend 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 several SCCA national and regional events. The first race finish came in May at Cumberland Airport, Heppenstall finishing a close second to Bob Nagel’s 7-litre McKee. An engine-gearbox failure caused retirement at Grattan Raceway, Michigan, at the beginning of June. On June 8th, at the Old Huntsville Airport in Alabama, Heppenstall won the preliminary for the Heart of Dixie race, and then the main race the following day, the first race wins for a turbine powered car. In Maryland the following weekend, at Marlboro Speedway, Dick Thompson joined Heppenstall for the 4½ hour 300-mile race, with the newer TX-2 being raced for the first time. Thompson won the sprint race on Saturday, then the following day, with Heppenstall, the 300, leading from start to finish.

The Watkins Glen 6 hours in July was the next FIA Championship outing, and for the first time both TXs were raced, with Thompson/Heppenstall being joined by Hugh Dibley/Bob Tullius. The cars qualified eighth and ninth, 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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Marlboro 1968 (Photo by kind permission of Roy Des Ruisseaux)

The final TX race appearance in the US came at the beginning of August, at the new Donnybrooke Speedway in Minnesota. Here, Heppenstall placed second in the Saturday race, and third on Sunday, both races being won by Jerry Hansen's CanAm Lola T70.

The Le Mans 24 hours on 28th/29th September turned out to be something of a disaster for the team. After only three laps Thompson came back in to hand over to Heppenstall, feeling that his car was not 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, and thereafter running reliably, it was finally disqualified in the seventh hour having covered insufficient distance.

1968 Race Results

3/4 February	Daytona	24 Hours	FIA Championship	
race # 76	chassis TX-1	white/blue	Ray Heppenstall/ Dick Thompson/ Ed Lowther	retired
23 March	Sebring	12 Hours	FIA Championship	
race # 76	chassis TX-1	white/blue	Dick Thompson/ Ed Lowther/Ray Heppenstall	retired
7 April	Brands Hatch	BOAC 500 (6 hours)	FIA Championship	
race # 35	chassis TX-1	white/blue	Dick Thompson/Hugh Dibley	retired
12 April	Oulton Park	Guards Spring Cup (100 miles)	BRSCC	
race # 68	chassis TX-1	white/blue	Hugh Dibley	retired
11/12 May	Cumberland Airport, West Virginia	Vandegrift Trophy (56 miles)	SCCA	
race # 76	chassis TX-1	white/red	Ray Heppenstall	2 nd , new lap record
2 June	Grattan, Michigan	100 miles	SCCA	
race # 76	chassis TX-1	white/red	Ray Heppenstall	retired

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8 June	Huntsville, Alabama		SCCA	
race # 76	chassis TX-1	white/red	Ray Heppenstall	1 st
9 June	Huntsville, Alabama	Heart of Dixie (57.5 miles)	SCCA	
race # 76	chassis TX-1	white/red	Ray Heppenstall	1 st , new lap record
15 June	Marlboro, Maryland	Sprint (17 miles)	SCCA	
race # 76	chassis TX-2	white/blue	Dick Thompson	1 st
16 June	Marlboro, Maryland	Marlboro 300	SCCA	
race # 76	chassis TX-2	white/blue	Dick Thompson/ Ray Heppenstall	1 st , new race record
13/14 July	Watkins Glen	6 Hours	FIA Championship	
race # 67	chassis TX-1	white/red	Hugh Dibley/Bob Tullius	12 th
race # 76	chassis TX-2	white/blue	Dick Thompson/ Ray Heppenstall	3 rd
10 August	Donnybrooke, Minnesota	45 miles	SCCA	
race # 76	chassis TX-2	white/blue	Ray Heppenstall	2 nd
11 August	Donnybrooke, Minnesota	90 miles	SCCA	
race # 76	chassis TX-2	white/blue	Ray Heppenstall	3 rd
28/29 September	Le Mans	24 Hours	FIA Championship	
race # 22	chassis TX-2	white/blue	Dick Thompson/Ray Heppenstall	Retired
race # 23	chassis TX-1	white/blue	Hugh Dibley/Bob Tullius	Disqualified

Although the TX had only achieved limited racing success during 1968, for the Howmet Corporation their novel car had been a highly successful promotional tool, having created a huge amount of publicity around the world. As it was unlikely this would be replicated the following year, Howmet chose not to continue with a race program in 1969, and Le Mans marked the final race appearance of the unique TX's.

Record Breaking

The cars were, however, retained for further promotional purposes. After being rolled at Le Mans chassis TX-2 was taken to Maurice Gomm's workshop in England, where it was rebuilt with open bodywork as the TX Mk. II. In this form, in August 1970, Heppenstall 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 up to 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, the coupe (TX-1) and the Mk. II Spyder (TX-2), to Heppenstall for a nominal one dollar, although the engines had to be returned to Continental.

The original coupe (TX-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 who restored it with a fully working Continental engine. TX-1 is now owned by Austrian Andreas Mohringer. The Mk. II Spyder (TX-2), less engine and transaxle, eventually found its way into the hands of enthusiast and collector Chuck Haines who entrusted its restoration to Bob McKee in Lake Zurich, Ill. With the original turbines no longer available, secondhand Allison 250C18

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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 Road America, 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 (TX-2) to Xavier Micheron in France. Micheron added a wastegate to the Allison engine, removing the turbine lag and improving driveability. TX-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, 2023

Wanted - If anyone has any reminiscences from seeing the car in 1968, I would be interested in hearing from them. Also of Bill Petrie, who worked with the team during 1968, or of any photos of car in 1968, especially from the SCCA races in the USA, particularly from Grattan, Michigan on 2nd June and Donnybrooke (Brainerd), Minnesota on 10/11th August - please email me at [petestowe @ talktalk.net](mailto:petestowe@talktalk.net)

Webpage

<https://bpmc.org.uk/petestowe/HowmetTX.htm>