= Howmet TX =

The Howmet TX (Turbine eXperimental) was an American sports prototype racing car designed in 1968 to test the competitive use of a gas turbine engine in sports car racing . Planned by racing driver Ray Heppenstall , the TX combined a chassis built by McKee Engineering , turbine engines leased from Continental Aviation & Engineering , and financial backing and materials from the Howmet Corporation .

Although not the first attempt at using a turbine powerplant in auto racing , the Howmet TX was the first and is still the only turbine to win a race , earning two Sports Car Club of America (SCCA) race victories and two qualifying sprint victories during its only year of competition . The TX later set six Fédération Internationale de l 'Automobile (FIA) land speed records for turbines after being retired from racing .

= = Development = =

Interest in the use of gas turbines as an alternative to the piston engine had been gaining support in the automobile industry during the 1960s . Chrysler had begun testing in the 1950s and began leasing their Turbine Car to the public in 1963 , while British manufacturer Rover and racing team BRM combined to build a racing car for the 24 Hours of Le Mans in 1963 and 1965 . Both cars showed reliability but were unable to win over the public or to win at Le Mans respectively . By 1967 , team owner and car developer Andy Granatelli had created the STP @-@ Paxton Turbocar for the Indianapolis 500 . The car nearly won the race driven by Parnelli Jones , but suffered a mechanical failure after leading over two @-@ thirds of the event . A similar attempt with a Lotus 56 in 1968 also led to retirement after showing winning potential .

At the same time as Granatelli 's turbine debut at Indy , racer Ray Heppenstall began to conceive a design for his own sports car to make use of a gas turbine , improving in some areas where the Rover @-@ BRM had failed several years before . Heppenstall felt that a more simplified design for the chassis could make a turbine @-@ powered car more competitive . Heppenstall originally proposed the car to Allison Engine Company and later to Williams Research . He eventually turned to fellow racer Tom Fleming for aid . Fleming was at the time vice @-@ president of Howmet Corporation , which provided castings for turbines in the aerospace industry . Heppenstall and Fleming were able to convince Howmet that their backing of a competitive and unique sports car could promote public awareness of the company . Howmet agreed to fund the project , lending their name to the car .

= = = Chassis = = =

Heppenstall began the project by purchasing a Cooper Monaco sports car , but later decided it was not the best choice for a turbine and the car was sold off . Bob McKee , owner of McKee Engineering , was then contracted by Heppenstall to build two cars brand new . The first space frame chassis was actually built from an older McKee car initially built for the Can Am series in 1966 , but adapted to house the turbine engine . The second car # GTP2 was built from scratch , allowing it to be purposely designed around the use of a turbine engine , including a chassis 2 @.@ 25 inches (57 mm) longer . The chassis were known as the Mk.9 to McKee , but only ever raced as turbines under the Howmet TX guise .

The Mk.9 was designed around the FIA 's Group 6 regulations for sports prototypes , allowing for a completely custom mid @-@ engine layout that was only limited in terms of engine sizes available to competitors . Closed cockpit bodywork with gullwing doors was designed by Bob McKee to shroud the mid @-@ engine layout . Standard double wishbone suspension with coil springs were used with disc brakes on each wheel . A 32 @-@ US @-@ gallon (120 L) fuel tank was placed between the cockpit and turbine , housing Jet A fuel .

= = = Turbine = = =

The turbines to power the two Howmet TXs were leased from Continental Aviation & Engineering . The TS325 @-@ 1 gas turbines were prototypes from an aborted bid for a military helicopter contract which Continental was not putting to use at the time . The loaned turbines weighed 170 pounds (77 kg) and were able to provide 350 bhp (260 kW) and 650 lbf · ft (880 N · m) of torque . A maximum of 57 @,@ 000 rpm was able to be reached .

A two @-@ stage setup used an internal power turbine to drive the rear wheels through the use of reduction gearing . Due to the wide variable output of the turbine and the high level of torque , a standard gearbox was not necessary , leaving the Howmet TX with only a single gearing speed . However , the gearing ratios were able to be quickly changed in the differential , allowing the car to be adapted to various circuits . Due to the use of a single @-@ speed transmission , there was no gearing for reverse . Although Heppenstall initially wished to do without reverse , the FIA mandated its use and a small electric motor powered by the turbine was installed , allowing the car to move in reverse .

The turbine itself used two large exhaust pipes . However , a third pipe was situated off @-@ center for use with a wastegate . The wastegate was designed to eliminate the lag between the driver pressing the accelerator and the turbine increasing its revolutions . Once the turbine was at its maximum revolutions , the wastegate helped regulate the amount of fuel actually entering the turbine , thus increasing or decreasing the power output .

Although turbines cannot have their displacement measured in the same way as a piston engine , the FIA used an equivalence formula to determine the Continental TS325 @-@ 1 's displacement of 2 @,@ 960 cubic centimetres (181 cu in) , although Heppenstall has since admitted that the engine was actually above the three litre limit . This allowed the Howmet to compete in the Prototype Under 3000 cc category of the Group 6 formula .

= = Racing history = =

Following completion of the two Howmet TXs , the cars were brought to the 24 Hours of Daytona , the opening round of the 1968 International Championship for Makes . Before even entering competition the TX earned attention , and was featured prominently on the cover of the race program . Although both cars were in attendance , only the newer (# GTP2) of the two was entered in the race ; the other car (# GTP1) was kept as a spare . The driving team of Heppenstall , Dick Thompson , and Ed Lowther qualified with a lap time seventh fastest overall . Several competitors made early refueling stops allowing the Howmet to improve to third place but on lap 34 the turbine wastegate failed to reopen , giving the driver too much power for the corner he was in . The car spun and hit a barrier , forcing the team to retire .

By the 12 Hours of Sebring a few months later , the TX was able to improve its pace , this time qualifying third , only a second behind a Porsche 907 and a Ford GT40 . The turbine ran reliably at first but , as the race continued , debris damaged the turbine and caused it to shake loose from its mounts . The TX was eventually retired after six hours . Following Sebring , the International Championship returned to Europe , and the Howmet team followed . They entered the BOAC 500 at Brands Hatch . Wastegate problems once again caused the car to wreck , this time after only seven laps . Staying in Britain , the Howmet team entered a national sprint race at Oulton Park for British driver Hugh Dibley . The failure of a starter motor during a pit stop , however , once again denied the TX the possibility of finishing the hour @-@ long event .

The TX returned to the United States to contest the SCCA National Championship rather than stay in Europe for the remainder of the International Championship . Closer to home , the problems with the experimental TX were able to be overcome as the car finished its first race , the Vandergraft Trophy in New Cumberland , West Virginia . Heppenstall drove the car to a second @-@ place finish , setting a new lap record for the circuit . Following a retirement in Michigan , the TX next arrived at the Heart of Dixie event in Huntsville , Alabama . A short sprint race was held on the day prior to the main race in order to determine the starting order of the field . The Howmet TX was able to earn victory in the sprint , allowing it to start on pole position for the main event . From there the

TX dominated the event and earned another win . These two victories marked the first @-@ ever wins by a turbine @-@ powered car in a racing event .

With the first victory earned by the Howmet TX , Heppenstall was once again joined by Dick Thompson for the Marlboro 300 . Once again the car won the short qualifying race to earn pole position and went on to lead every lap of the main event , winning by an eleven @-@ lap margin . Feeling that the TX was now capable of taking on European entries , both TXs were entered in the 6 Hours of Watkins Glen , another round of the International Championship . Hugh Dibley and newcomer Bob Tullius were entered in the first car , while Heppenstall and Thompson shared the second . The cars qualified eighth and ninth fastest . Following early accidents by the factory Porsches the TX cars were running third and fourth overall . The Dibley and Tullius car suffered a transmission problem in the closing hour requiring the car to crawl around the circuit until the end of the race . The other entry remained on pace until the end , finishing on the podium overall and was the highest finisher in its class . The podium earned Howmet four points towards the International Championship .

After the Watkins Glen success , the two cars were prepared for an attempt at the 24 Hours of Le Mans , which had been postponed until September . French aluminium company Pechiney sponsored the team 's bid at the 24 hours . The same drivers were assigned to the cars , but their qualifying performance at the Circuit de la Sarthe was hampered by the long straights . Twentieth fastest was the best performance from the two cars .

For the race itself , mechanical problems appeared early as Thompson 's car suffered after only three laps . The fuel system was not providing enough Jet A to the turbine to allow it to produce its full power output , meaning the car had to limp down the circuit 's long straights . While that car continued at a slowed pace , the other suffered a wheel bearing failure two hours later , requiring a lengthy three @-@ hour repair . By the sixth hour of the event the car was disqualified by race officials , having covered an insufficient distance of only 60 laps . The remaining fuel @-@ starved TX did not last much longer as Thompson crashed in the Indianapolis corner .

With the 1968 season over , Heppenstall planned for the following year , including the development of a new multi @-@ gear transmission to replace the single speed unit . However , Howmet felt that the program was not providing adequate promotion for the company and decided to discontinue it .

= = = Land speed records = = =

Howmet decided in 1969 that although the racing program was too expensive to continue , the two cars it owned could still be put to promotional use . Heppenstall decided that he would attempt to repair the second TX chassis (# GTP2) to adapt new open @-@ cockpit bodywork , earning it the name Howmet TX Mk.II. The new vehicle attempted to break world land speed records for turbine @-@ powered cars . With the TX Mk.II weighing approximately 1 @,@ 000 kilograms (2 @,@ 200 lb) , the car was able to make attempts at two classes of records thanks to the addition or subtraction of ballast .

On a road next to Talladega Superspeedway in August 1970 , Heppenstall drove the TX Mk.II to six records recognized by the FIA , with the timing recorded by the new International Motor Sports Association (IMSA) .

= = = Later use = = =

In 1971 , Howmet ended their promotional use of the two TX cars . The two chassis were sold to Rey Heppenstall for one dollar . However , because the two Continental turbines had been leased to Howmet , they had to be returned once the cars were no longer under Howmet 's control . Heppenstall eventually sold the two chassis .

Chassis # GTP1 was bought by Jim Brucker and stored in his personal collection in California . On display , it featured a mock @-@ up of the Continental turbine in the engine bay . The car was bought in 2006 by Bruce Linsmeyer of Avon Aero and has been restored with an original Continental turbine . Following restoration , # GTP1 won the Sebring Trophy at the 2007 Amelia Island Concours

d 'Elegance .

The second car , chassis # GTP2 , was converted from its open @-@ cockpit bodywork back into its original closed @-@ cockpit design in a restoration carried out in by McKee Engineering at the behest of new owner Chuck Haines . The restoration of Chassis # GTP2 was completed in July 1996 . Original Continental turbines could not be obtained , so an Allison 250C18 turbine was installed . Chuck Haines participated three times to Goodwood Festival of Speed . In 2006 , It was later sold to Xavier Micheron who adapted the wastegates system to the Allison turbine . # GTP2 has since participated in the Le Mans Classic event in 2008 , 2010 and 2012 , as well as in the Classic Endurance Racing series from 2009 to 2012 . It also came back to Goodwood Festival of Speed in 2009 . It is now in the ROFGO collection .

During Haines ' ownership of chassis # GTP2 , Bob McKee completed a spare frame , known as # GTP3 , to original specification for Haines . Again , due to the lack of a Continental turbine , the Allison unit was used instead . The different powerplant required some redesign , as the exhaust was now vented out of the top of the engine cover instead of out the rear of the car . # GTP3 do not have the wastegates system . Haines has entered the car in historic motorsport events , including the 2007 Goodwood Festival of Speed .