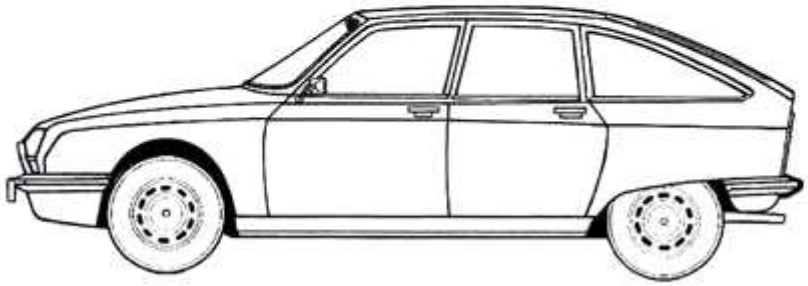
CITROËN GS/GSA



INTERESSENGEMEINSCHAFT

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PRESS INFORMATION

CITROËN

EMBARGO TO:-

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THE CITROEN "GS"

The Citroen "GS" is a four door, five seater saloon. It has front wheel drive, a 4 cylinder air-cooled engine with two overhead camshafts, hydropneumatic suspension, four power-operated disc brakes with double circuit operation, and brake effort distribution according to load.

The "GS" fits into the Citroen range of cars between the "Ami 8" and the "D 19 Special", an area of the private car market which has the highest percentage of new car ownership. This new car will enable Citroen to satisfy all their clients' requirements, from the "2CV" and "Dyane" through to the "DS 21 Injection" and the Citroen "SM".

By virtue of its position in the range and of Citroen's programme of production, and equally because of the place which it will take in the automobile market, the "GS" is a high volume production vehicle.

This basic definition is supported by two series of considerations, technical and commercial :

Technical specification :

In order to satisfy the needs of the greatest possible number of users, it was necessary for the "GS" to consist of many intrinsic qualities which would not only combine superior technical detail of high quality with wide appeal, but which would also be capable of satisfying contradictory requirements such as town and open road use, family and sporting use, practical and yet exciting use.

Commercial specification :

In addition to the specific technical qualities of the car, it was necessary to establish a balance between the price and the degree of equipment and finish, in order that the proposition as an investment to its clientele might ensure a strong demand.

These objectives have been achieved, due to the work of not only Citroen's Research Division, but also to the detailed study given to the problem by the Production and Methods Division, which have enabled the high degree of Citroen's technical and experimental development over a number of years to be available to a vast clientele, developments which have been continuously improved on existing models in relationship to both their functional qualities and to their viability in practical use.

The "GS" may therefore be described as a vehicle of synthesis :

A synthesis in terms of specific technical qualities of the vehicle by way of being able to reconcile contradictory requirements : space with convenience, comfort with speed, performance with economy, performance with practicability, town use with road use, air cooling with silent operation, etc., etc.

A synthesis between the traditional qualities of Citroen engineering which have established the reputation of the marque, and a price which could bring this new model within the reach of a vast number of people, bearing in mind the evolution of the automobile market.

For Citroen, the definition of the "GS" as an "intermediary car" is a definition which is self-explanatory, since it leads one to draw obvious conclusions from the evident economy of use of the 2CV and Dyane and the comfort of the ID and DS. The aim has been achieved, even in regard to several well established features : for example, in regard to aerodynamics, hydropneumatic suspension and a similar, yet improved, braking system to that on the DS.

The "GS" puts into practice superior technical specifications, yet still satisfies essential requirements in regard to appearance, finish and equipment.

The "GS" has an absolutely original and functional body which is aerodynamic, which has superb visibility and space, which is totally practicable without in any way resembling a utilitarian estate-type car. Its roadholding, performance, its manoeuvrability, have made this new car as totally acceptable for town use as for the open road, or for that matter on tortuous lanes or on motorways. Well priced, easy to

maintain and costing little to run, the Citroen "GS" is capable of more than satisfactory performance in conditions of absolute safety and comfort.

Every effort has been made by the Citroen factory in order to bring out a truly new vehicle, full of new features and qualities at a competitive price. To achieve this, a number of solutions, certain of them having been perfected over a long period of time and certain of which are entirely new, have been put into practice so that the "GS", at a competitive price, puts into the hands of its owners more car and more satisfaction than any client has been able to purchase hitherto.

COACHWORK

Styling :

The "GS" is a low-line vehicle with a long profile, and is particularly well-balanced due to the very short front and rear overhangs. Its sloping bonnet, flowing lines, its sharply cut off tail, give it a dynamic and sporting appearance. Its completely original frontal design combines a beehive type air-intake grille with new styled headlights. Its side panels are curved, as are all the side window glasses. Its clean swept profile gives an impression of speed, as does the sweep of the roof line towards the rear. A quick comparison throws into relief the success of the Styling Department of the Research Division of Citroen : the "GS" appears to be considerably longer than the "Ami 8" yet it is, in fact, only 5 ins. more. Actually, this "big car" measures only 13 ft. $6\frac{1}{4}$ ins. overall in length.

AERODYNAMICS

The aerodynamics of the "GS" have been carefully studied, a subject which Citroen have researched for a considerable time and in which they have extensive experience. Its air resistance (which is directly linked to speed and fuel consumption) is far lower than is usually accepted by present day standards : its aerodynamic efficiency factor is 15% better than that of the DS which, until the introduction of the SM, could claim to be a production car with one of the best profiles in the world.

As an example of the advantages of good aerodynamics, to travel at a constant 75 m.p.h., the "GS" needs 30 b.h.p., at this speed the engine has a potential output of 50 b.h.p., therefore there are 20 b.h.p. in reserve for overtaking, climbing gradients, etc.

SAFETY

The construction design of the Citroen "GS" offers its occupants maximum safety without the use of excessive weight, and allows for greater impact resistance and structural strength.

The principle of the design of the body of the "GS" is shown by the presence, at both the front and the back of the passenger compartment, of extremely strong assemblies connected to the infrastructure. They are connected by means of a lower assembly consisting of a floor pan whose side-sections are attached to the lower rails of the side-panels and form chassis longerons; the upper portion of the passenger compartment consists of a tubular cant-rail also connected to the front and rear assemblies.

This concept provides efficient protection to the occupants of the vehicle in the event of a collision, and a continuity of distribution of stress when the vehicle is moving. At the same time, it ensures torsional and flexural rigidity for comfort and for roadholding.

Scientifically designed collapsible panels absorb the kinetic energy created in the event of a collision.

The bumpers are wide, and of deep section.

SPACE

Taking into account the deep study of aerodynamics, of resistance to collision and of overall conception, the interior dimensions of the "GS" are extraordinarily generous in terms of both height and width (especially shoulder room and hip room at the front; 50.5 ins. at the front and 52.75 ins. at the rear). To answer market demands, the principle of the utilitarian five-door saloon-estate formula has been avoided. But with no detrimental effect on boot space. The actual shape of the boot is such that all surfaces are flat and are at right-angles to each

other, and there is therefore no dead space.

The rear bumper is integral with the boot lid, and in fact lifts up with it so that the aperture for loading is as wide as the boot itself and gives free access direct onto the low, flat floor. The spare wheel is housed under the bonnet. With its 16 cu. ft. of boot space, the "GS" will carry a cabin-trunk of practically the same volume, or a barrel 28 in. in diameter, or certainly all the family luggage.

VISIBILITY

The total glass area, which is extensive in relation to the size of the car, surrounds the passenger compartment with panoramic visibility which ensures maximum possible safety for its occupants. The large rear window is exactly the same area as the windscreen.

The door glasses, which wind right down into the door, are curved and of the same surface area at the front as at the rear. The third glass on each side is not just a small ventilator, it is in fact an integral part of the concept of providing as large a glass area as possible around the vehicle.

SOUND PROOFING

Apart from the conventional methods of sound proofing a vehicle which in the case of the "GS" have been generously and judiciously employed, and apart too from the problems of sound proofing an air-cooled power unit which in the case of the "GS" have been almost completely solved, particular effort has been put into the question of eliminating transmission of road-noise.

ENGINE

The engine of the Citroen "GS" is a Flat-Four, four cylinders in light alloy, and has two overhead camshafts.

The flat four horizontally opposed formula has been chosen because of its excellent balance which, in fact, reduces engine vibration and therefore noise. The reciprocating forces and resultant vibrations are in fact ten times less evident on a flat four than on a four cylinder in line engine of the same output. Furthermore, the centre of gravity of a flat four is evidently lower than that of the classic four in line.

Extraordinarily short and compact, this engine increases the interior space of the vehicle and enables an ideal passenger compartment layout within the wheelbase which greatly improves roadholding. Over square, (74 x 59), the power unit offers a very high power output per litre, at a relatively low piston speed.

The valve layout is in "V" formation which enables the use of the most efficient type of combustion chamber shape. The valves are driven by two overhead camshafts, one on each bank of two cylinders, which enable the engine to be free-revving, and for a high r.p.m. figure to be maintained without any trouble.

The engine has been conceived to run for at least 60,000 miles without major overhaul, and this is why it was decided to make it air-cooled. This principle does give incomparable advantages : great reliability, simplicity, and ruggedness, and the normal causes of breakdown have been greatly reduced. There are no head gaskets, no water hoses, no fan belt, the fan being driven directly from the crankshaft; there is a great reduction in weight and in space taken because there is no water radiator or header tank; it is easy to work on and to maintain and the "GS" is not affected by cold or heat and will function efficiently under all climatic conditions; it gives immediate starting, rapid warm-up, reduced efficiency-loss due to air-cooling, and power loss is absolutely negligible, mainly due to the fact that enormous progress has been made in the design, the type and the layout of the cooling fins and heat exchange surfaces. Because the area necessary for air-cooling is greatly less than that necessary for a water-cooled engine, the aerodynamic efficiency of the vehicle is improved still further.

It can be seen that the advantages are enormous and it is understandable why Porsche, for example, have adopted the solution of a flat, air-cooled, high-performance engine. However, there is one possible disadvantage and that is noise. But, on the "GS" it has practically disappeared. The problem has been attacked at its source as, in the final analysis, noise created by an engine nearly always comes from the combustion chambers. The answer to this on the "GS" has been to use extremely rigid cylinder heads. To achieve maximum performance and durability,

the principle of overhead camshaft valve control has been selected. By doing so, the reduction in mechanical noise is remarkable. The adoption of a very recent yet well proven technique has helped to solve the problem even further; after thousands of hours of testing and perfecting for performance and reliability, both under laboratory conditions, and on the road, it was decided to drive the camshafts by means of toothed belts.

This technique which gives the "GS" engine extremely efficient performance, as well as total reliability, also gives quieter running than the majority of conventional water-cooled engines (the sonic register curves resulting from testing the noise level proves it conclusively). It certainly provides a really outstanding solution, and it is part of the Citroen concept of ultimate development for the medium car that is to bring to the mass market the advantages hitherto available only to the users of more expensive and more sophisticated machines.

"GS" owners will only be aware of the fact that it is an air-cooled engine by the quick warm-up achieved, which enables instant use of the total performance of the vehicle almost immediately after the engine is switched on, and the rapid availability of the heating in winter.

Engine lubrication includes a special filter and a large oil radiator in light alloy, which has been added to improve efficiency and reliability under all climatic conditions and in all usages of this new vehicle.

The "GS" has been conceived as a vehicle for the environment of today. By adopting specific technical solutions in the design of the engine, Citroen is facing up to one of the problems of modern life, that of atmospheric pollution. The "GS" engine is basically a "low-pollutant" power unit, and is readily adaptable to all foreseeable European anti-pollution regulatory standards.

TRANSMISSION

The Citroen "GS" is of course a front wheel drive car. The principle of front wheel drive has been pioneered and perfected by Citroen over a period of 36 years. And there was a time when the front wheel drive/rear wheel drive controversy was a subject of great interest and excitement.

This time has now passed and, little by little, the exponents of rear wheel drive have turned to the logical solution. In its time the "Light Fifteen" was undisputedly the fastest and safest car of its class. The "SM" is just that today.

So the characteristics of front wheel drive on the Citroen "GS" are already very well known, as well as its advantages, without going into particular detail at this time. All one need say is that the characteristic tendency to understeer, which any car which is to be put into the hands of a large number of people should have in order to be safe to drive, is further increased on front wheel drive vehicles due to the effect of torque on the front driving wheels. Auto-stability which is relative to the power being transmitted, and which is contrary to the effect of propulsion through the rear wheels even on a well-balanced car, is greatly improved on a front wheel drive vehicle. There is always a time on a rear wheel drive car when the dangerous condition of over-steer will occur, this danger increasing as rear wheel adhesion diminishes.

Under ideal conditions such as good surface, dry, with no wind, and on good tyres, the handling of a car can seem, to the average driver, very little different whether it be a front wheel drive or a rear wheel drive vehicle. But, as soon as an obstacle or a difficulty occurs the difference certainly shows itself, especially on a wet surface. On snow or ice, the advantages of front wheel drive soon establish themselves.

The mechanical gearbox has four synchromesh forward gears. The gear change lever is mounted on a floor console.

SUSPENSION

The suspension of the "GS" is hydropneumatic on all four independently suspended wheels. This is, without doubt, the first time that a manufacturer has included a type of suspension on a car of this type and class, which is normally reserved for cars of a larger size and higher price.

Hydropneumatic suspension is already well known. Like front wheel drive, it has been pioneered by Citroen. It first appeared in 1953 on the rear suspension of the "Six H", (Fifteen/6) and then, 1955, it was used on all four wheels of the "DS" range. This system has given the "DS" and "IDs" a reputation for roadholding and comfort which has not yet been equalled.

Only hydropneumatic suspension with its combination of great flexibility and its system of self-levelling, has enabled improvements to both comfort and road-holding at the same time. It has enabled the transmission of bumps resulting from poor road surfaces to be eliminated from the body of the vehicle and, at the same time, forces all four wheels into constant contact with the road, yet absorbing immediately all tendency for the wheels to rebound.

For 17 years, many research engineers, through continuous work on the subject, have unceasingly perfected the hydro-pneumatic system with the aim of not only improving its operation, but also improving the quality of its manufacture. This has resulted in reduction in production costs, and in new manufacturing processes.

The hydropneumatic suspension on the Citroen "GS" is the final result of a proven technique which has been developed continuously through the production of more than one million "DSs" and the "GS" benefits from its very latest develop-ments. It represents the climax of the research, in the fields not only of comfort and roadholding, but also in regard to reliability in use and in ease of maintenance, research incidentally which only Citroen has been able to undertake and to offer to a very wide sector of the market.

The ground clearance of the vehicle remains constant, what-ever the load, by means of front and rear automatic height correctors. This ground clearance can be adjusted by a lever, within reach of the driver, on the centre console. Pre-set positions can be used at will to increase ground clearance, and to facilitate wheel changing.

COMFORT

Hydropneumatic suspension is certainly a very important factor in the comfort of a vehicle, but only those who have had lengthy experience of it under all road conditions are able to judge it completely. In the world of motor cars, hydropneumatic suspension is rather like high-fidelity in radio equipment, it is when using it that one realises the complete difference that exists between normal solutions to a problem, and those which employ a high degree of technique.

With hydropneumatic suspension, the occupants of a car have little impression of road shocks. But on the "GS", the suspension has been even further refined; the front suspension geometry employs an anti-dive system (the transverse link arms for the front suspension have been so inclined as to counteract the forces of acceleration and deceleration, and the car is maintained constantly parallel to the road). This applies even when accelerating from rest quickly, or when braking violently.

ROAD HOLDING

Major improvements have been applied to the "GS" suspension, as a result of many years of research on suspension flexibility rates.

New damping devices have already been developed following an extensive programme of "R & D", supported by wide-spread use of computers and the creation of new testing equipment and methods. These devices were first introduced on the "DS 21 Injection" and on the experimental Rotary "M 35".

Now, in their application to the "GS", they are improved still further.

The new damping methods thus evolved, which are linked with new "bump-and-rebound" stop positioning and size, in conjunction with front and rear stabilizer bars acting on the upper-suspension link arm, have practically eliminated the discomfort of crossing hump back bridges and driving over potholes at high speed. It has also resulted in an incredible reduction in body roll and pitching when cornering, thus making the cornering power of the "GS" one of its most amazing features.

These devices, in conjunction with Citroen's total anti-dive layout, gives this new "GS" incomparable directional stability and roadholding.

RELIABILITY

Simultaneously with the research and development given to perfecting suspension behaviour, careful attention was given to reducing manufacturing costs in order to achieve economic mass production of the hydropneumatic suspension system and to increase reliability and improve running economy.

A major step was taken in 1966, when a mineral based hydraulic fluid, "LHM", was introduced to replace the synthetic based fluid hitherto used. The use of this new "LHM" fluid and the improvements which have been built into the units on the hydropneumatic system such as the high pressure pump, pressure regulator by the adoption of a "pilot slide valve", and other hydraulic assemblies, have all given the hydropneumatic suspension a coefficient of reliability which is far superior to that which can be achieved by using exclusively mechanical devices.

In order to justify this claim, it must be stated that, in a hydropneumatic assembly, the pressure slide valves and the respective bores in which they operate have been machined with extreme precision from highest quality metal, and that the oil film which spaces the slide valves from the bores in which they move is constant since it is supplied by oil under high pressure.

Any mechanical device conceived and produced by man has always been continuously improved, whatever standard may already have been achieved. It is therefore quite normal that a new and careful study can prove that, for the same cost, further improvement can be achieved. And this is the case on the suspension for the "GS". Because this is a brand new design, new production methods had to be developed allowing the product to benefit simultaneously from all the cumulative experience in this field, and from new solutions which are not automatically applicable on existing models. One example of this, is that it has been possible to equip the "GS" with a new type of high pressure pump which is mounted on its engine, and with hydropneumatic suspension cylinders of an entirely new design.

The new high pressure pump is a synthesis of all the development experience accumulated over a period of 15 years. It is quiet in operation, it has a new constant high pressure lubricating device, its piston operation is not affected by high engine speeds, the life of the non-return valve is almost limitless. The life of this pump is certainly as long as the life of the engine itself. The suspension cylinders have been specially designed for the "GS", and production methods have been employed to produce them at a cost compatible with a high volume production car. They are perfectly sealed, having both high and low pressure seals, even to the extent of it being possible to drive the car with two suspension cylinders having no seals at all.

Experience of this sealing process has been gained through extensive use on Citroen buses, which are equipped with hydropneumatic suspension systems.

The most important result is that Citroen, in fitting hydropneumatic suspension on the "GS", is offering something far more important than just the pioneering and improvement of a new automotive technology. What they are now able to do, is to put this principle of operation into the hands of a very large number of car buyers at a time when its development has reached perfection for comfort, safety and economy.

BRAKING

Braking on the "GS" is through the medium of discs on all four wheels. It is a dual circuit braking system with full power operation, which is automatically controlled in terms of pressure according to the weight being carried in the vehicle and its location. Braking is extremely gentle and progressive.

A brake pedal controls the hydraulic distributor which feeds two independent circuits. High pressure from the main accumulator supplies the front discs and pressure from the rear suspension system supplies the rear discs, the latter automatically feeding pressure according to the load in the vehicle, and thus eliminating the risk of premature rear wheel locking. Since the brakes are supplied from a high pressure source, response time is reduced. The action of the pedal which controls the pressure feed to the brakes being merely that of a valve-opener, its travel is minimal, and thus further reduces response time. It is an essential factor of preventive safety.

Brake pressure is, first of all, varied according to the pressure applied on the pedal by the driver. Invariably, the first time that a driver uses a device such as this, he feels surprise. Surprise, because of its immediate effectiveness, and because deceleration occurs more quickly than on a normal motor car. Citroen have intentionally eliminated the traditional methods by which a progressive increase in brake pressure may be obtained, because this type of progressive increase would be a factor detrimental to rapid deceleration on emergency braking, or whenever fractions of a second count.

Supplying the brakes from a high pressure source gives, in terms of safety, an advantage which experience has shown to be valid countless times : contrary to what happens in the classic power assisted braking system, the available power is not related to pedal travel, and this ensures total operating efficiency even in the event of excessive use of fluid (such as in the case of deformation caused by an abnormally high temperature, or in the case of unusual deterioration in brake lining condition).

This power braking for a relatively light car (880 kg., 1940 lbs. kerb weight), makes the "GS" a pleasant car to drive, and the system is highly efficient and extremely reliable.

The Michelin radial tyres, of the latest design and generously dimensioned, are an integral part of the overall concept and contribute inherently to the remarkable roadholding and stability of the "GS".

STEERING

The "GS" steering is amazingly precise and pleasantly light. The wide track at the front of the car has been designed to give the high transverse rigidity necessary for optimum efficiency. It has also been designed to give precise steering without any parasitic elasticity which could affect straight-line stability. The pivot axis of the front wheels passes through their point of contact with the ground, a geometry which ensures considerable safety. This principle has been employed by Citroen on both the "DS" and the "SM".

The "GS" is totally unaffected by dissymetric effects on the front wheels caused by road surface or condition, effects which include adhesion variations between the right and the left wheel (the same applying to braking as well), unaffected too by unilateral shocks, unavoidable running on two different surfaces (the road edge for example). Even if the "GS" were deprived, due to breakdown, of the use of one of its front brakes, or if one of the tyres were to deflate suddenly at high speed, there would be no immediate effect on the steering or on the brakes, and the vehicle would remain steady on its trajectory. Apart from this, and contrary to what normally happens with most front wheel drive cars, the steering of the "GS", of the rack and pinion type, is very light and manoeuvrable, even when parking.

Accurate, light, and unaffected by road conditions, the steering on the "GS" is the most advanced and agreeable in its class.

The steering wheel, of a new and original shape, is upholstered, and is therefore comfortable and easy to handle. The whole steering assembly has been conceived according to the most demanding safety requirements.

EQUIPMENT

Two versions of the "GS" will be available in 1970. The equipment on the Club version is very complete, and is superior to nearly every car in its class, and better than some which are more expensive. Its equipment includes an electronic rev counter, brake pressure warning light, oil pressure warning light, fresh air blower, two-speed electric windscreen wiper, headlight flasher, cigar lighter, clock, dipping rear view mirror, illuminated boot, courtesy lights, etc.

The "GS" is equipped with a new and unusual speedometer. Road speeds are shown through a permanently illuminated magnifying viewer which is rheostatically controlled, and which is immediately readable by day or night. The driver no longer needs to look for a road speed indicated by a speedometer needle. The road speed is constantly shown right in front of the driver's eyes and, simultaneously, the braking distance is shown alongside each figure.

The full value of this innovation is thrown into relief on this new model, in which the sensation of speed and acceleration is almost non-existent, due to the enormous attention paid to the suspension system and to silent running.

The driving position has been specially laid out with all warning lights right in front of the eyes of the driver, and with all controls within his easy reach. In both models his seat is adjustable for fore and aft movement, and for rake.

The Club version has quartz iodine lights and a reversing light as standard.

Interior appointments have been designed with a sense of 'elegance' yet they are perfectly functional. The seat upholstery comes in either ventilated vinyl or jersey nylon material in four different colours.

The boot is lined and illuminated. The body is treated against rust by electrophoresis and tectylisation and it comes in eight colours.

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