AGCO
SISU POWER

SisuDiesel
Citius series marine engines

Clean and durable choice

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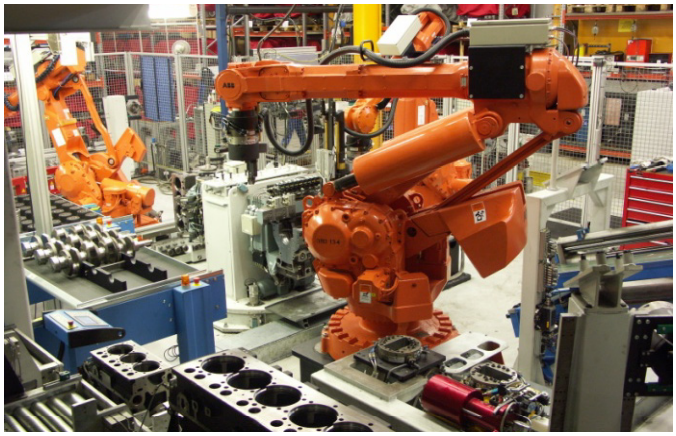
AGCO SISU POWER – power for the world with over 60 years' experience

AGCO SISU POWER Inc. (former Sisu Diesel) was founded in 1942. The company and its products were known under the Valmet brand until 1997. Since 2004 the company has been a part of international AGCO Group. AGCO is the third largest agricultural machine producer in the world and its well known brands include Massey Ferguson, Fendt and Valtra. Over 700 persons work at AGCO SISU POWER factory in Nokia, Finland. SisuDiesel engines are manufactured also in Brazil primarily for South American markets.
Over 60 years of engine construction has resulted as high technology, which can be seen both in products and in production. Throughout its history AGCO SISU POWER has developed many innovative technical solutions, which have not been introduced by our competitors until 21st century. For example direct injection technology, cross-flow cylinder head, centrally supported cylinder liners and advanced turbocharger technology have been everyday features in SisuDiesel engines already for decades.



Uncompromising professional skills

The assembly of basic engines as well as the painting of complete engines is handled entirely by robots. Skilled professionals make the final installations and inspections. Quality and environment systems are certified according to the ISO 9001 and ISO 14001 standards.

Clean and durable choice – SisuDiesel

No compromises are made in the development of SisuDiesel engines; all solutions aim to reliable and long-lasting engines with low operating costs. Our own R&D operations are further enhanced by a broad network of partners. Environmental friendliness is the cornerstone of AGCO SISU POWER R&D operations. SisuDiesel engines comply with the latest EU and North American emission regulations and development work for next stages is being carried out long before they come into force. SisuDiesel engines offer the same uncompromising performance also with 100% Biodiesel.

Engines for demanding marine use

The basic construction of the SisuDiesel engines has been designed for extreme conditions – from blistering equatorial heat to the harsh winters in Northern Europe. A growing number of manufacturers are choosing reliable SisuDiesel engines to power their advanced machinery and equipment. Quality materials and advanced manufacturing processes ensure excellent reliability. That's why custom made SisuDiesel marine engines propel all kinds of watercrafts reliably on all seas throughout the world.

Strong and reliable marine engines in power range 130 – 410 hp

Citius series 4 and 6 cylinder marine engines have been constructed for use where reliability, low operating costs and easy servicing are the most important features. When classic sturdy basic construction is combined with new generation control electronics and modern injection system, the result is a SisuDiesel engine that meets even the most demanding user needs.

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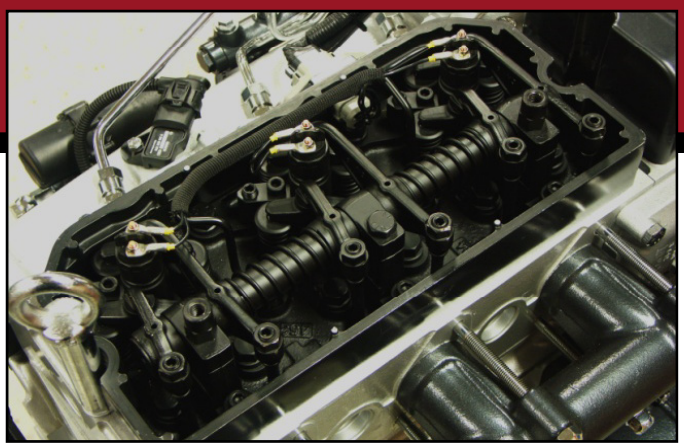
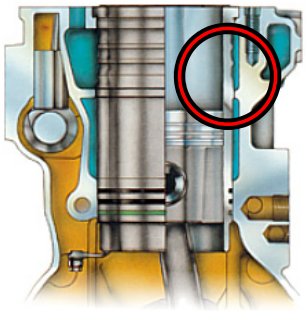


Four valve cylinder head

Citius series marine engines feature a four valve cylinder head. This facilitates injector arrangement between the valves in the middle of the cylinder while the combustion chamber is on the piston top. Two inlet and two exhaust valves with their own ports improve gas exchange. The fuel mixes better with air, which results as reduced emissions and improved fuel economy. In addition better gas exchange reduces heat load in the cylinder area.
44 CTIM-2V engine still has cross-flow two-valve head. Also there have port design and valve timing been optimized for emissions and fuel economy.

Centrally supported cylinder liners

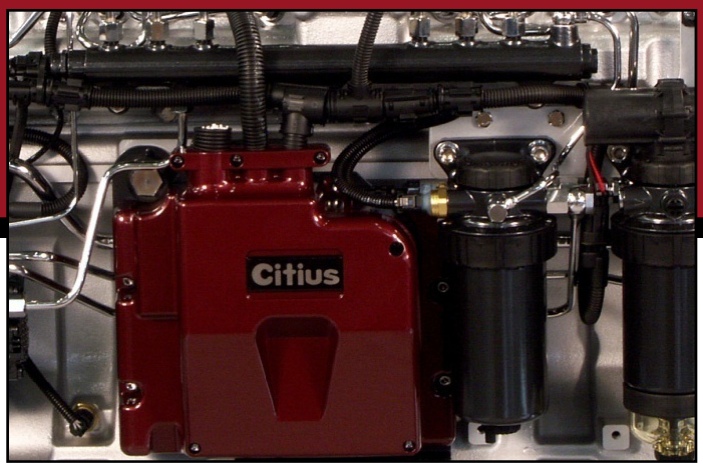
Citius series marine engines have centrally supported cylinder liners. This feature is unique for an engine of this size, but already traditional for SisuDiesel. When cylinder liner vibration is reduced, cooling becomes more effective, cylinder liner and piston ring wear as well as oil consumption are reduced, which results as longer engine life.



Common Rail injection system

Citius marine engines use Common Rail injection system, which allows considerably higher injection pressure than before. In addition the control unit adjusts the injection pressure to optimum in all situations – it is high already at low engine speeds and at high speeds it is limited to adequate value.

Electronic control enables injection even at five different stages during the combustion process. The control system analyses and adjusts the fuel quantity to engine up to over a hundred times in second. Sequential injection is one of the most significant factors in reducing emissions while keeping the fuel economy as good as possible.



Third generation engine control electronics EEM3

The third generation electronic control system developed for Common Rail engines offers very versatile features for user's benefit. Bosch supplies Common Rail components and basic program ware; AGCO SISU POWER develops motor specific SisuTronic control program, though. The whole injection process is totally controlled, e.g. injection advance is adjusted to optimum depending on conditions. The advance has essential effect on emissions.
Cold start and cold running adjustments are controlled automatically depending on ambient and engine temperatures. Starting is good with only slight smoking. Electronic engine protection functions are built into the control system. The system analyses constantly possible injector faults, rail pressure and operation in every cylinder.

More enjoyable sound

In Citius series marine engines the combustion pressure raises slowly thanks to pre-injection and does not cause typical sharp diesel sound. So the running sound of Citius engines is smooth and pleasantly low. The new timing gear profile on Citius series is also reducing mechanical sound significantly. Lower noise level offers more pleasant environment on the watercraft.

Easy servicing

The motor has a clean-cut construction and service points are easily within reach. For example fuel filters can be changed quickly without tools and fuel spill. Spare parts are highly standardized between various engine types, which makes spare parts service and service labour rapid.

An EEM3 service tool has been developed for Citius series engines. It is a Windows based special program that makes reading fault codes and engine running history and reloading of new programs easy.

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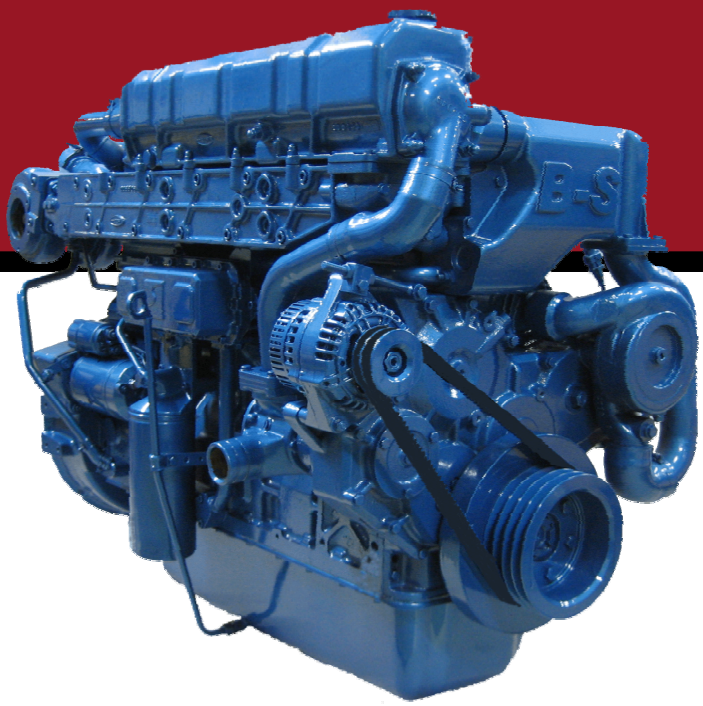
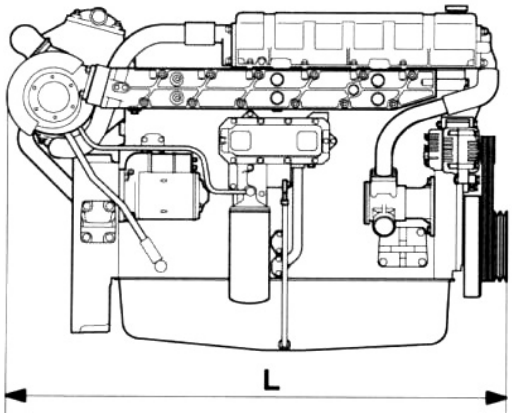


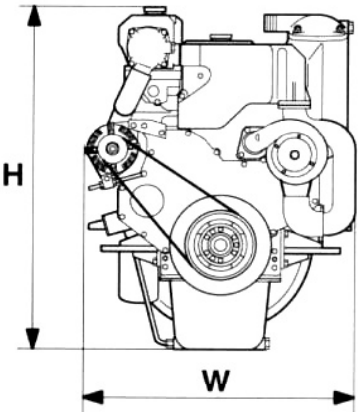
Complete equipment

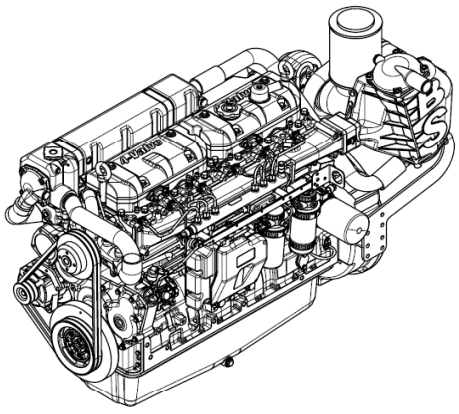
Citius series marine engines have integrated lightweight alloy marine parts; water-cooled exhaust manifold, heat exchanger and raw water pump. Intercooler is connected to raw water circulation, when a better efficiency and cleaner exhaust gases are gained. Citius series marine engines can with their wide option range be customized according to customer request within short delivery time.

SisuDiesel Citius marine engine range

Type	44 CTIM	49 CTIM	66 CTIM	74 CTIM	84 CTIM
No. of cylinder/Valves	4/2V	4/4V	6/4V	6/4V	6/4V
Displacement (l)	4,4	4,9	6,6	7,4	8,4
Power (kW/hp(r/min))	100/136 (2200)	133/180 (2200)	192/260 (2200)	235/320 (2200)	302/410 (2100)
Length (mm) (**L**)	1112	1112	1451	1451	1456
Width (mm) (**W**)	654	672	639	639	742
Height (mm) (**H**)	896	896	914	914	954
Weight (kg) (dry)	530	530	710	730	800







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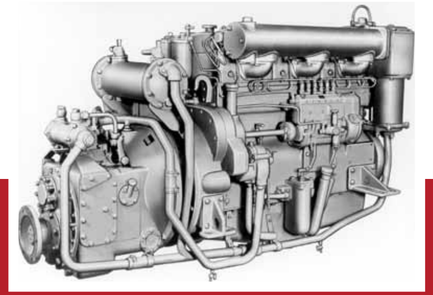
Marine auxiliary applications

AGCO SISU POWER engines are designed for demanding off-road machinery applications. Robust construction, durability, reliability and strong torque are features the SisuDiesel engines are famous for throughout the years. Continuous research and development has contributed in significant improvements in combustion process of this engine series. These technically essential changes further strengthen the best properties of these engines. Citius series engines are available for keel / box cooling, as well as for radiator cooling applications

Increased power density – reduced gas and noise emissions

These engines fulfil the European CCNR Stage II emission requirements. NOx emissions comply with requirements stipulated in Regulation 13 of Annex VI of MARPOL 73/78, engines with higher than 130 kW are certified. Solutions used for reducing emissions have simultaneously enabled the increase of power density and torque level while maintaining good fuel economy. Reduction in combustion noise has been achieved by the use of pilot injection. Also the new gear design and profile of timing gears introduced in Citius series engines essentially reduces the mechanical noise. 4 valve cylinder head technology is standard on electronically controlled Common Rail engines.

AGCO SISU POWER continues the
brand heritage of VALMET
over 60 years in Diesel Engine industry



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Marine auxiliary applications

Fuel injection system

C series marine gen set engines are implemented either with Common Rail fuel injection system. Supplier of the components and basic software for CR system is Robert Bosch GmbH, while customized program design and CAN bus communication software are developed and applied by AGCO SISU POWER. The CR system allows substantially higher injection pressures than conventional, mechanical systems. D series engines run with reliable Stanadyne DB series injection pump and mechanical governor. These engines are, naturally, based on the same robust engine design as those with higher performance ratings.

Third generation electronic engine control system, SisuTronic EEM3

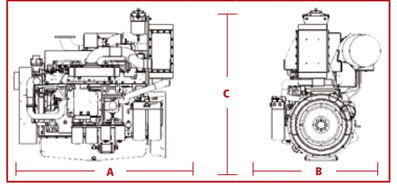
Citius series Common Rail engines feature a state-of-the-art, third generation control electronics based on years of development and application experience in the field. The electronic control system developed for the CR injection system enables also the phasing of injections upto five stages during one and same combustion process. Control system enables best load acceptance in this power range.

Technical information

Engine Type	49 DTG	49 DTAG	74 DTAG	49 CTAG	74 CTAG	84 CTAG
PRP (kW) / 1500 rpm	74	95	146	116	182	250
LTP (kW) / 1500 rpm	81	103	163	128	200	275
Number of cylinders	4	4	6	4	6	6
Displacement (litres)	4,9	4,9	7,4	4,9	7,4	8,4
Cylinder bore (mm)	108	108	108	108	108	111
Stroke (mm)	134	134	134	134	134	145
Rotation	CCW	CCW	CCW	CCW	CCW	CCW
Compliant to CCNR	Stage II	Stage II	Stage II	Stage II	Stage II	Stage II
MARPOL	N/A	N/A	Tier II	N/A	Tier II	Tier II
Aspiration	TC	TC, CAC				
Injection system	Rotary mechanical			Common rail		
Governor system	Mechanical			Electronic. SisuTronic EEM3		

Engines for keel / box cooling application

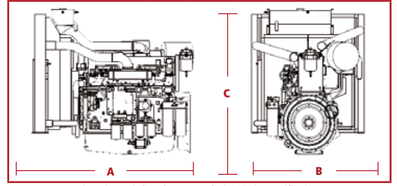
ENGINE TYPE	Dimensions mm A	B	C	Dry Weight kg
49 DTG	1080	750	1075	460
49 DTAG	1080	750	1090	475
49CTAG	1080	750	1090	500
74 DTAG	1320	920	1250	700
74 CTAG	1320	920	1250	735
84 CTAG	1250	810	1250	810



Dimensions only for reference, not for installation specifications

Engines with radiator and CAC

ENGINE TYPE	Dimensions mm A	B	C	Dry Weight kg
49 DTG	1340	750	1130	500
49 DTAG	1420	950	1240	505
49CTAG	1420	950	1240	530
74 DTAG	1580	1100	1350	725
74 CTAG	1580	1100	1350	775
84 CTAG	1610	1100	1280	850



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