

**FICHE TECHNIQUE MOTEUR KART
SUBARU KX-21 - WORMS KX-21**

MOTOR KART WORMS KX-21 HOMOLOGATION FORM



le 13 février 2018

Stéphane Laville

1. General

1.1 Manufacturer

1.2 Commercial name

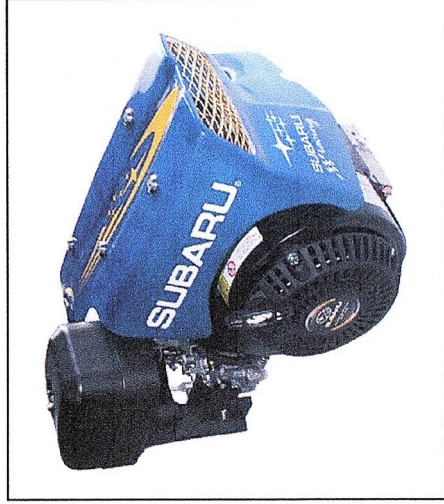
1.3 Cylinder capacity

1.4 Foto's

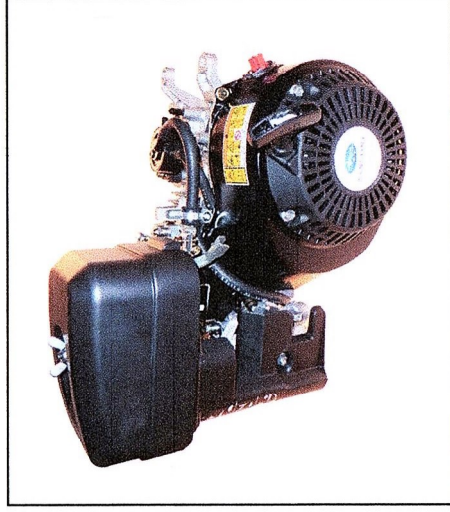
WORMS Entreprises
WORMS Sports Kart Engine
KX-21

211 cm³

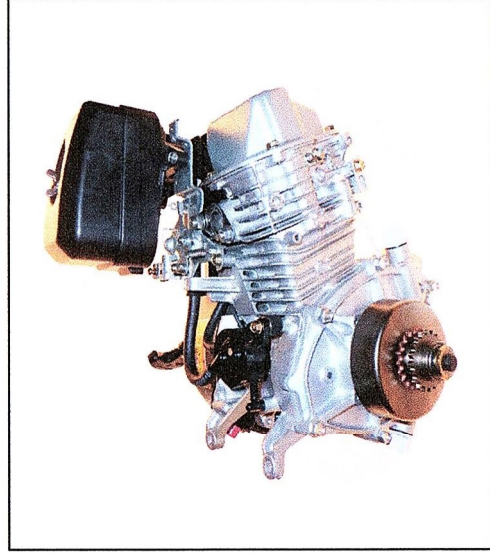
A



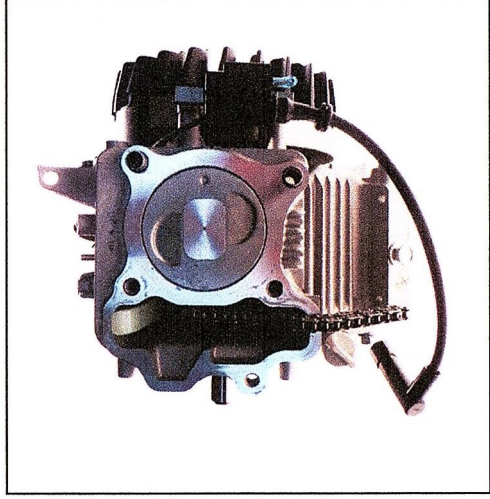
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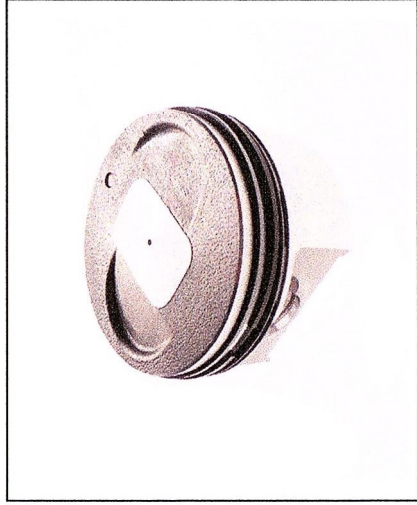
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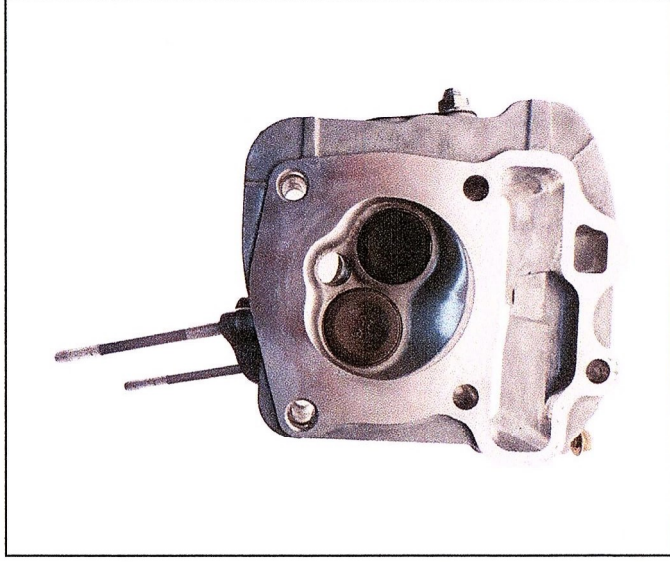
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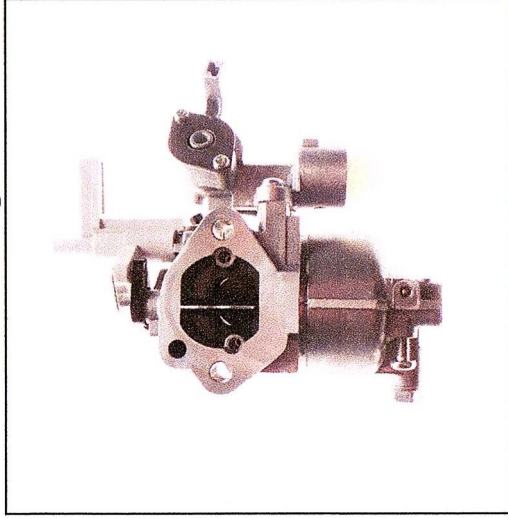
E



F



G



2. Dates of engine

2.1 Cycle:

4-stroke

2.2 Number of cylinders:

1

2.3 Min. total volume of combustion
chambre:

21,60 cm³

2.4 Min. total volume of combustion
chambre in the cylinder head:

cm³

2.5 Maximum compression ratio:

10.0

2.6 Minimum height of cylinder Block:

100,00 mm (measured from crankshaft center axle
to cylinder head gasket surface)

2.7 Material Cylinder block:

Aluminium

See also drawings 1-5

2.8	Sleeves	a)		YES
		c)	Material:	cast iron sleeve
2.9	Capacity per cylinder:	a)	Max. permitted capacity per cylinder:	211 cm ³
	b) Bore:	c)	Maximum permitted bore:	67,019 mm
		d)	Maximum stroke:	60 mm
2.10	Piston(s)	b)	Number of rings: 3	190 g
	a) material: Alum alloy	c)	Minimum weight of the complete piston, including pin, clips, rings:	36,00 +/- 0,1 mm
		d)	Distance from gudgeon pin center line to highest point of piston:	40,00 +/- 0,1 mm
		e)	Distance from gudgeon pin center line to edge of rotor contour:	0,1 +/- 0,2 mm
		f)	Distance (+-) between the top of the piston at TDC and gasket plane of the cylinderblock:	0,4 cc +/- 0,2 cc
		g)	minimum piston groove volume:	
2.11	Connection Rod-mat	b)	Big end type:	diagonally divided
	a) material: Aluminium			30,1 mm +/- 1 %
	c) Interior diameter of big end (without bearings):			68,50 mm +/- 0,05 mm
	d) length between the axes:			138 g
	e) minimum weight:			
2.12	Crankshaft	a)	Type of manufacture:	Moulded
		b)	Material:	Steel alloy
		c)	Number of crankshaft-bearings:	2
		d)	Type of crankshaft-bearings:	Radial
		e)	Ext. diameter of crankshaft-bearings:	100 mm +/- 1 %
		f)	Bearings caps material:	/
		g)	Minimum weight of the bare crankshaft	1918 g with 2 tooth gear press fitted(timing governor)
			Pressed governor drive gear can be removed !	

Tolerance:
+/- 1 %



2.13 Flywheel

- a) Material: **Steel**
b) Minimum weight of flywheel: **2400 g**

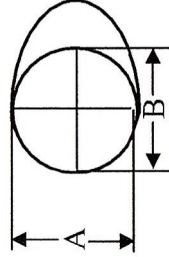
2.14 Cylinder head

- a) Material: **Aluminium**
b) Minimum height: **64,50 mm**
c) where measured: **From sealing – to sealing surface**
0,20 +/- 0,05 mm

2.15 Thickness of lightened cylinder head gasket:

2.16 Camshaft

- a) Number: **1**
b) Driving system: **high**
(Timing chain system)
c) chain length: **281,7/284,9 mm**
d) Diameter of camshaft: **84,00mm +/- 2 %**
e) Type of valve operation: **chain-driven overhead cam and overhead valve construction, with a single cam**
f) Cam dimensions
A= **24 mm +/- 1 %**
B= **29 mm +/- 1 %**



2.17 Timing

- a) Theoret. Timing Clearance:
Inlet: **0,12/0,15 mm** exhaust: **0,15 mm**
b) Valves open at: (with Theoret. Timing Clearance "a")
Inlet: **135 ° ATDC** Exhaust: **162 ° BBDC**
c) Valves Closed at: (with Theoret. Timing Clearance "2.17a")
Inlet: **47 ° ABDC** Exhaust: **0 ° BTDC**
d) Maximum valve stroke (with Theoret. Timing Clearance "a")
Inlet: **244 ° ATDC** Exhaust: **71 ° BTDC**

e) Angel between inlet- and exhaust-valve(s): 0°

2.18	Inlet		
a)	Material of the manifold:	Steel	
b)	Number of manifold elements:	1	
c)	Number of valves per cylinder:	1	
d)	Maximum diameter of the valves head:	28,50 mm.	
e)	Diameter of the valve stem:	- 5,45 /- 0,5 mm	
f)	Interior cooling of valve	NO	
g)	Length of the valve:	67,80mm. +-1 %	
h)	Minimum weight of valve:	27 g.	
i)	Type of valve springs:	Coil spring	
k)	Number of springs per valve:	1	
l)	Exterior diameter/ max length of springs:	21, 50 +- 1 mm. / 27,40 mm.	
m)	Number of spring coils:	5	
n)	Diameter of spring wire:	2,30 mm +- 0,1 mm.	
o)	Valve spring washer :	1	
p)	Valve spring washer thickness	1,00 mm +- 0.05 mm	
2.19	Exhaust		
a)	Material of the manifold:	Steel	
b)	Number of manifold elements:	1	
c)	Diameter of the outlet manifold:	22 mm. +- 1 %	
d)	Number of valves per cylinder:	1	
e)	Maximum diameter of the valves head:	26,50 mm.	
f)	Diameter of the valves stem	- 5,4 /-0,5 mm	
g)	Interior cooling of valve	NO	
h)	Length of the valve:	67,60 mm. +- 1 %	
i)	Minimum weight of valve:	26 g.	
k)	Type of valve springs	Coil spring	
l)	Number of springs per valve:	1	

m)	Exterior diameter/ max length of springs:	21, 50	+ - 1 mm.	127,40 mm.
n)	Number of spring coils:		5	
o)	Diameter of spring wire:		2,30 mm + - 0,1 mm.	
p)	Valve spring washer :		1	
q)	Valve spring washer thickness		1,00 mm + - 0.05 mm	

3. Carburettor

a) Number: 1

Mark and model: **MIKUNI** (American Corporation)

d) Number of throttles / slides per carburettor: **1**

e) Max diameter of flange hole of carburettor exit point: **22 mm**

f) Max diameter of the venturi at the narrowest point: **17 mm**

g) Main Jet : 83.8

h) Pilot Jet : 41.3

3.1 Intake silencer / air filter:

a) material: **Plastic/paper**

b) Dimensions: see drawing page 5 (9)

4. Electrical equipment

a) Starting system: Recoil type

b) Voltage: **12 V**

Parameter	Value	Unit
c) Capacity of battery:	1	Ah

d) Generator: NO

Type: /

4.1 Ignition system

a) type: Transistorized magneto

b) Number of plugs per cylinder: **1**

Number of distributors: 0

d) Number of coils: **1**

e) Number of contact breakers: 0

f) Number of condensers: 0

5. Engine cooling

a) Type:

Forced air cooling system

b) Maximum capacity cooler:

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6. Lubrification

a) System :

Splash Lubrification

b) Number of oil pumps: 0		c) Material of the sump:	system /																								
7. Clutch	a) Type: NORAM b) Drive system: c) Number of centrifugal weights: d) Max. exterior diameter of the shoes:	Centrifugal clutch Mechanic 2 shoes 106 mm +/- 1 mm	Permanent																								
8. Ratios of engine:	permanent																										
Ratio: NO	Number of teeth:																										
9. Gearbox																											
9.1	Number of speeds:		NO																								
9.2 Ratios:	<table border="1"> <thead> <tr> <th>Ratio</th> <th>Number of teeth</th> <th>Synchro</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> </tr> <tr> <td>Reverse</td> <td></td> <td></td> </tr> </tbody> </table>			Ratio	Number of teeth	Synchro	1			2			3			4			5			6			Reverse		
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2																											
3																											
4																											
5																											
6																											
Reverse																											



10. Additional information

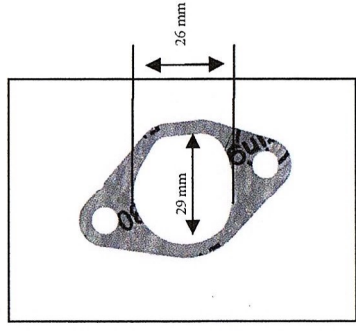
11. Drawings

1)

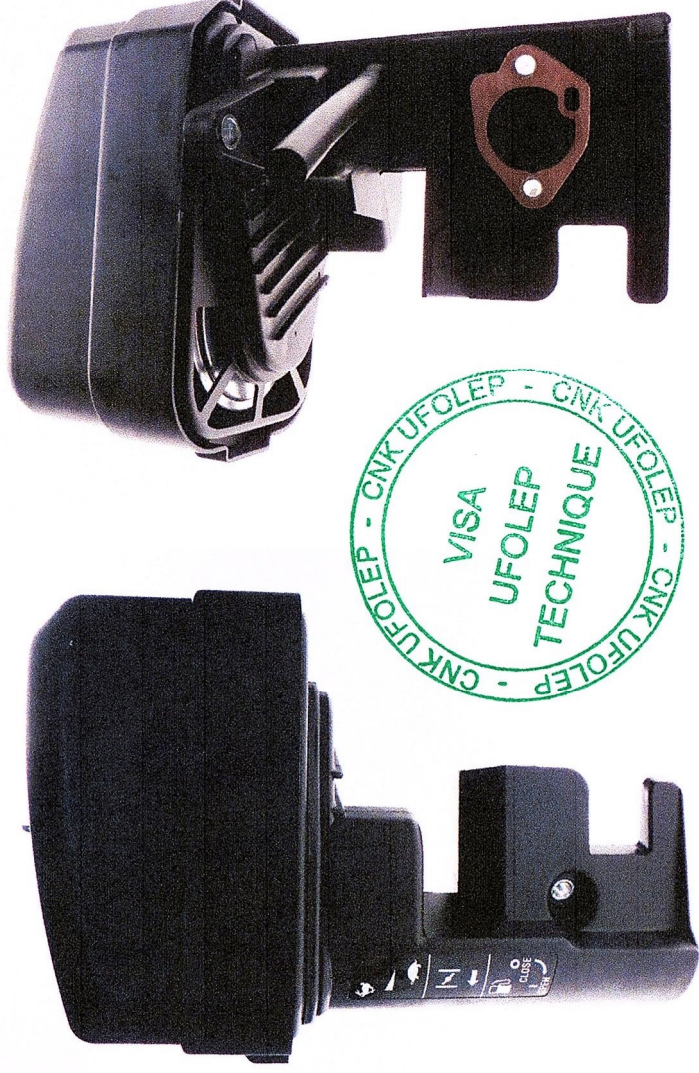
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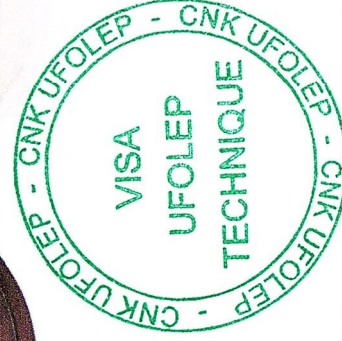
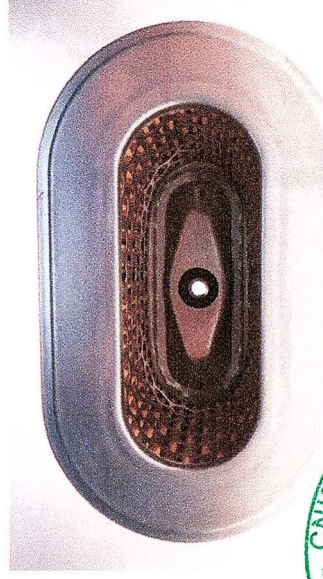
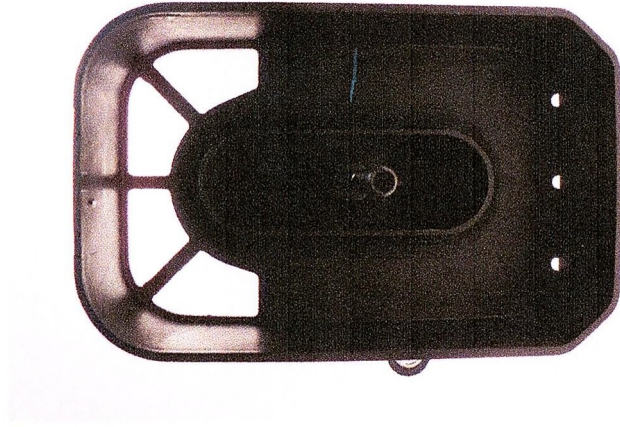
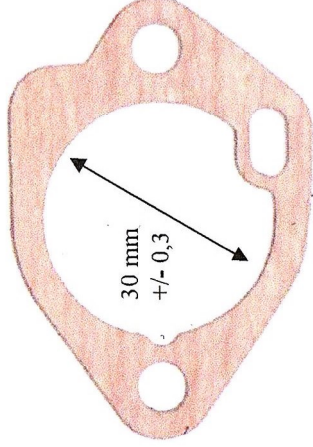
→ -2% , +4%

Cylinder head inlet orifices on manifold side (tolerances on dimensions.: (-2%, +4%))

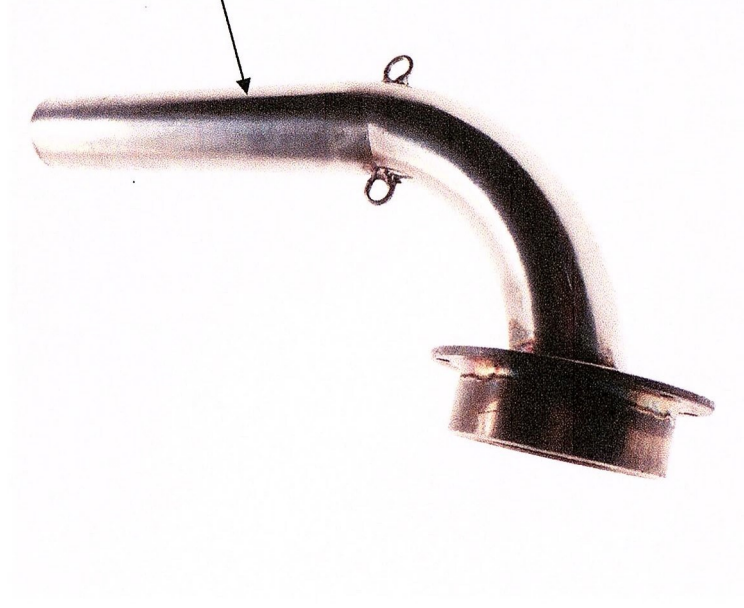
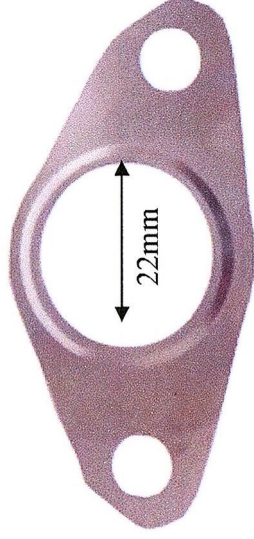
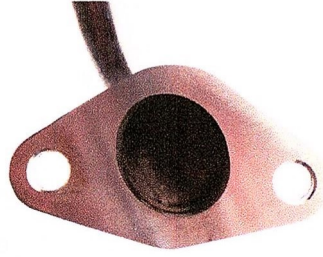
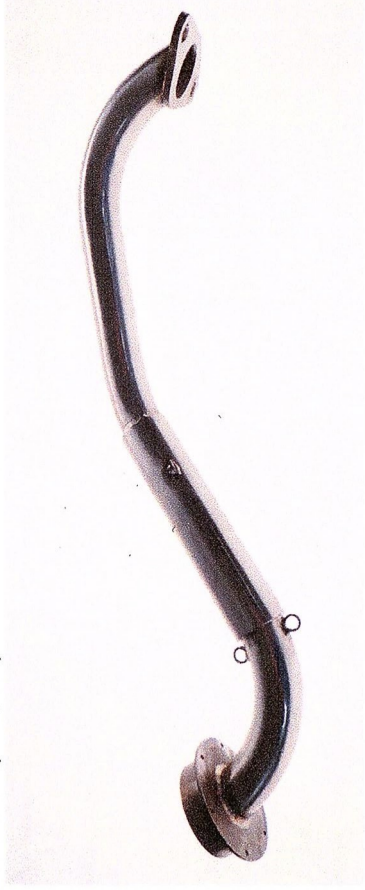


4) Intake silencer



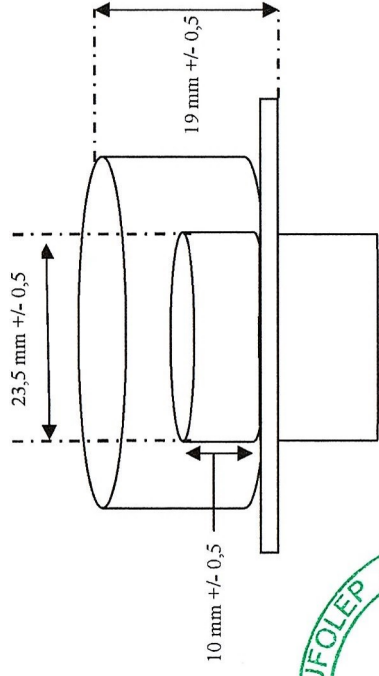


Cylinder head exhaust orifices on manifold
(tolerances on dimensions : (-2%, 4%))

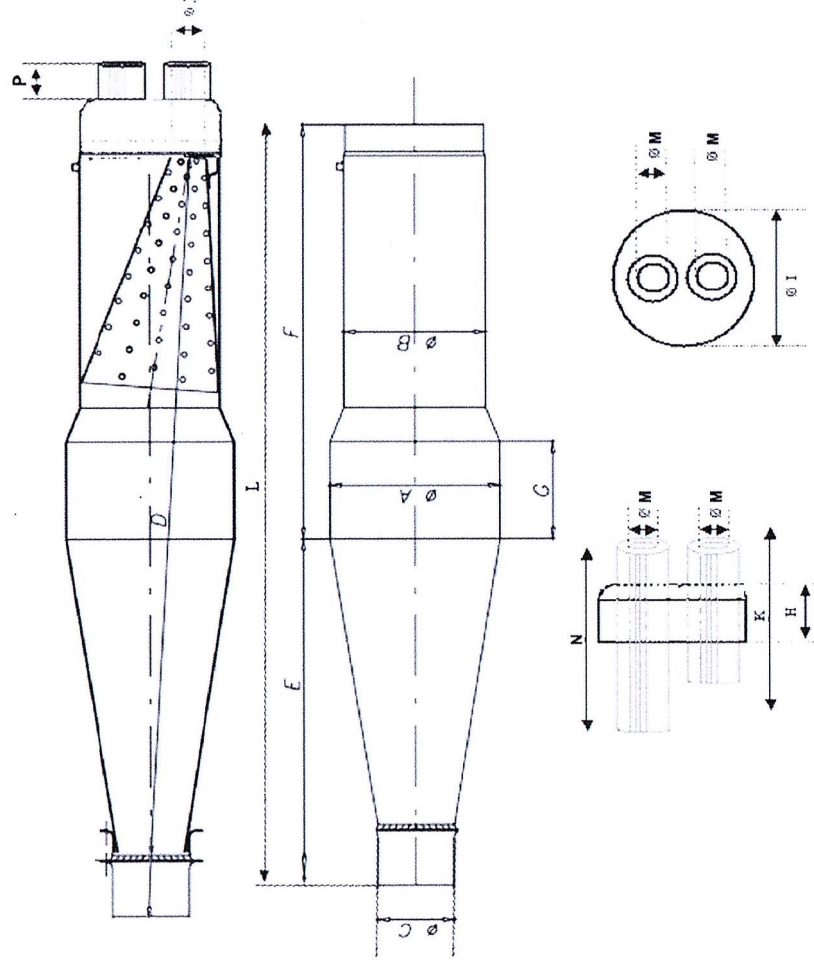


Ø 27,5 mm +/- 0,5





5) Muffler:



Ø A : 107,50 mm	E : 22,5 mm +/- 0,5	Ø I : 101,0 mm +/- 3,5 mm	Ø M : 21 mm +/- 0,2 mm
Ø B : 100 mm	F : 20,5 mm +/- 0,5	Ø J : 43,00 +/- 0,5	Ø N : 132 mm +/- 0,5 mm
Ø C : 45,5 mm +/- 0,5	Ø G : 4,00 mm +/- 0,5	K : 84,5 mm +/- 0,3 mm	P : 39,5 mm +/- 0,5
D : 40,00 mm +/- 0,5	H : 36,5 mm +/- 0,3 mm	L : 43 mm +/- 0,5	

12. Other info

