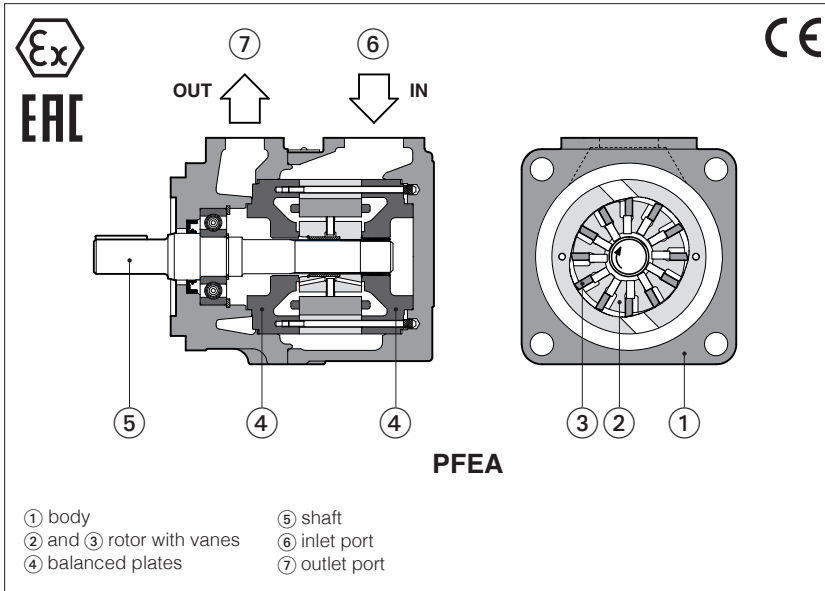


# Ex-proof vane pumps type PFEA

fixed displacement - for potentially explosive atmospheres - **ATEX, EAC**



**PFEA** are fixed displacement vane pumps available in three body sizes and two executions.

They are certified for application in potentially explosive atmospheres according to ATEX, EAC, protection mode

Ex II 2/2G Ex h IIC T5, T4 Gb, and Ex II 2/2D Ex h IIIC T100°C, T135°C Db

(group II for surface plants with gas, vapours and dust environment, category 2, zone 1, 2, 21 and 22).

The external surface temperature of the pump is in accordance with the certified class, to avoid the self ignition of the explosive mixture present in the environment.

PFEA are available in two executions:

**PFEA-\*1** max pressure **210 bar**

**PFEA-\*2** max pressure **210 ÷ 300 bar**

Displacements up to **150 cm<sup>3</sup>/rev**

## 1 MODEL CODE

<b>PFEA</b>	<b>XA</b>	<b>- 31</b>	<b>036</b>	<b>/ 1</b>	<b>D</b>	<b>T</b>	<b>/ 7</b>	<b>*</b>	<b>/ *</b>
Fixed displacement vane pump with ex-proof certification									
Additional suffix for pumps with through shaft, for coupling with 2nd pump type PFEA - see sect. 5: <b>XA</b> = for coupling with PFEA-31 <b>XB</b> = for coupling with PFEA-41 (only for PFEA-41, 42 and PFEA-51, 52) <b>XC</b> = for coupling with PFEA-51 (only for PFEA-51 and 52)									
<b>Size:</b> <b>31, 41, 51</b> (standard) <b>32, 42, 52</b> (high pressure and low noise)									
<b>Displacement of PFEA-31, 41, 51</b> [cm <sup>3</sup> /rev] for PFEA-31: <b>010, 016, 022, 028, 036, 044</b> for PFEA-41: <b>029, 037, 045, 056, 070, 085</b> for PFEA-51: <b>090, 110, 129, 150</b>									
<b>Displacement of PFEA-32, 42, 52</b> [cm <sup>3</sup> /rev] for PFEA-32: <b>016, 022, 028, 036</b> for PFEA-42: <b>045, 056, 070, 085</b> for PFEA-52: <b>090, 110, 129, 150</b>									
						<b>Port orientation</b> , see section 9: <b>T</b> = standard <b>U, V, W</b> = on request			
						<b>Direction of rotation</b> , viewed from the shaft end: <b>D</b> = clockwise <b>S</b> = counterclockwise			
						<b>Drive shaft:</b> cylindrical, keyed <b>1</b> = standard <b>2</b> = long version - only for PFEA-41 and PFEA-51 <b>3</b> = for high torque applications splined: <b>5</b> = for single and multiple pumps (any position) <b>6</b> = for single and multiple pumps (only first position) <b>7</b> = for second and third position in multiple pumps			
								<b>Seals material:</b> omit for NBR (mineral oil & water glycol) <b>PE</b> = FKM (1)	
								Series number	
								<b>Option:</b> <b>7</b> = for ambient temperature up to 70°C (1)	

(1) Pumps with option **7** are always equipped with seals FKM

## 2 GENERAL CHARACTERISTICS

Assembly position	Any position
Loads on the shaft	Axial and radial loads are not allowed on the shaft. The coupling should be sized to absorb the power peak.
Ambient temperature range	-20°C to +70°C
Compliance	Explosion proof protection "Ex h", see section 7 RoHs Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n° 1907/2006

## 3 HYDRAULIC CHARACTERISTICS of PFEA - 31, 41, 51 based on mineral oil ISO VG 46 at 50°C

Size code	31						41						51			
Displacement code	010	016	022	028	036	044	029	037	045	056	070	085	090	110	129	150
Displacement (cm <sup>3</sup> /rev)	10.5	16.5	21.6	28.1	35.6	43.7	29.3	36.6	45.0	55.8	69.9	85.3	90.0	109.6	129.2	150.2
Max working pressure (1) (bar)	160	210														
Recommended pressure on inlet port	from -0,15 to 1,5 bar for speed up to 1800 rpm; from 0 to +1,5 bar for speed over 1800 rpm															
Min speed (rpm)	800															
Max speed (2) (rpm)	2400	2800	2800	2800	2800	2500	2500	2500	2500	2500	2500	2000	2200	2200	2200	1800
Volumetric efficiency (3)	80	83	87	90	90	92	90	92	93	93	93	94	93	93	93	94
Noise level (3) (dBA)	62	62	63	63	63	64	67	67	68	68	69	69	72	72	73	74

**Notes:** For speeds over 1800 rpm the inlet port must be under oil level with adequate pipes.

**(1)** Max pressure for all models with water glycol fluid or option /PE is **160 bar**.

**(2)** Max speed with water glycol fluid or option /PE is **1800 rpm**.

**(3)** Measuring data with: n = 1450 rpm; P = 140 bar.

## 4 HYDRAULIC CHARACTERISTICS of PFEA - 32, 42, 52 based on mineral oil ISO VG 46 at 50°C

Size code	32				42				52			
Displacement code	016	022	028	036	045	056	070	085	090	110	129	150
Displacement (cm <sup>3</sup> /rev)	16.5	21.6	28.1	35.6	45.0	55.8	69.9	85.3	90.0	109.6	129.2	150.2
Max working pressure (1) (bar)	210	300			280		250	210	250			210
Recommended pressure on inlet port	from -0,15 to 1,5 bar for speed up to 1800 rpm; from 0 to +1,5 bar for speed over 1800 rpm											
Min speed (rpm)	1000	1200			1000		800	1000			800	
Max speed (2) (rpm)	2500	2500			2200		2000	2000			1800	
Volumetric efficiency (3)	86	87	90	90	93	93	93	94	93	93	93	94
Noise level (3) (dBA)	62	63	63	63	66	66	67	67	71	71	72	72

**Notes:** For speeds over 1800 rpm the inlet port must be under oil level with adequate pipes.

**(1)** Max pressure for all models with water glycol fluid or option /PE is **160 bar**.

**(2)** Max speed with water glycol fluid or option /PE is **1800 rpm**.

**(3)** Measuring data with: n = 1450 rpm; P = 140 bar.

## 5 OPTION FOR PUMPS WITH THROUGH SHAFT

Pump size	PFEA-31 PFEA-32	PFEA-41 PFEA-42				PFEA-51 PFEA-52				
Through shaft option type	XA	XA	XB	XA7	XB7	XA	XB	XC	XA7	XB7
Splined coupling characteristics	SAE 16/32-9T	SAE 16/32-9T	SAE 16/32-13T	SAE 16/32-13T	SAE 12/24-14T	SAE 16/32-14T	SAE 13/32-13T	SAE 12/24-14T	SAE 16/32-13T	SAE 12/24-14T
2 <sup>nd</sup> pump	PFEA-3* shaft type 5	PFEA-3* shaft type 5	PFEA-4* shaft type 5	PFEA-3* shaft type 7	PFEA-4* shaft type 7	PFEA-3* shaft type 5	PFEA-4* shaft type 5	PFEA-5* shaft type 5	PFEA-3* shaft type 7	PFEA-4* shaft type 7

**6 SEALS AND HYDRAULIC FLUIDS** - for other fluids not included in below table, consult our technical office

Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	15÷100 mm <sup>2</sup> /s - max start-up viscosity = 1000 mm <sup>2</sup> /s		
Max fluid contamination level	normal operation longer life	ISO4406 class 21/19/16 NAS1638 class 10 ISO4406 class 19/17/14 NAS1638 class 8	see also filter section at www.atos.com or KTF catalog
<b>Hydraulic fluid</b>	<b>Suitable seals type</b>	<b>Classification</b>	<b>Ref. Standard</b>
Mineral oils	NBR, FKM	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDR, HFDR	ISO 12922
Flame resistant with water	NBR	HFC	

**7 CERTIFICATION DATA**




Certification	<b>ATEX</b>	<b>EAC</b>
Protection mode	Ex II 2/2G Ex h IIC T5, T4 Gb, Ex II 2/2D Ex h IIIIC T100°C, T135°C Db	1Ex d IIC T5/T4 Gb X; Ex tb IIIIC T100°C/T135°C Db X
Type examination certificate (1)	TUV CY 19 ATEX 026182X	RU C - IT.AЖ38.B.00425/21

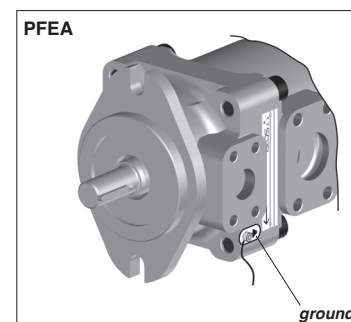
(1) The type examination certificates can be downloaded from www.atos.com

Certification type	<b>ATEX, EAC</b>	
Pump version	<b>(std and /PE)</b>	<b>/7 /PE</b>
Temperature class	T6	T5
Surface temperature	≤ 85°C	≤ 100°C
Ambient temperature	-20 ÷ +60°C	-20 ÷ +70°C
Max inlet fluid temperature	+60°C	+80°C
Protection degree	IP 66	

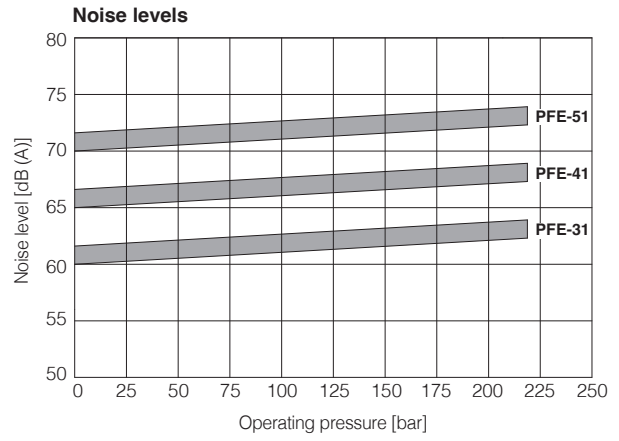
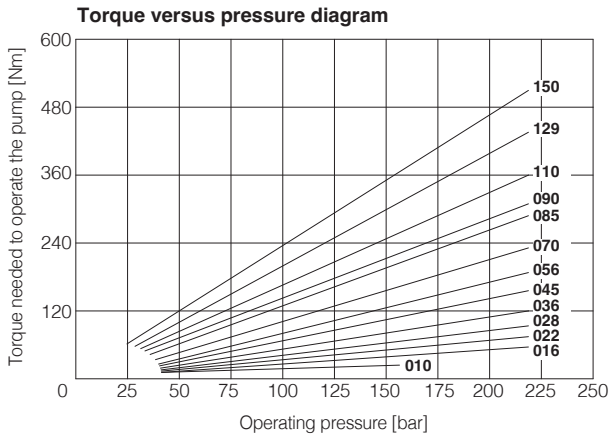
**⚠ WARNING: service work performed on the pump by the end users or not qualified personnel invalidates the certification**

**7.1 EXAMPLE OF PFEA NAMEPLATE MARKING**

 Atos spa - Via alla Piana, 57 21018 Sesto Calende (Va) Italy www.atos.com	MODEL N°	PFEA-31022/1DT **	SERIAL N°	220001	
	← ROTATION →		TP TC 012/2011		
 	II 2/2G Ex h IIC T 6 Gb II 2/2D Ex h IIIIC T 85 °C Db		№ ВАС RU C - ПЛЖ38.В.00425/21 Серия RU N°0333507		
	TUV CY 19 ATEX 0206193 X   IP66		1Ex d IIC T 6 Gb X Ex tb IIIIC T 85 °C Db X		
RPM	800 / 2800	Pin	0 :1.5 bar	Pmax	210 bar
		-20°C ≤ Toil ≤ +60 °C		-20°C ≤ Tamb ≤ +60 °C	
Marking according to Atex Directive					
Notified body and certificate number					



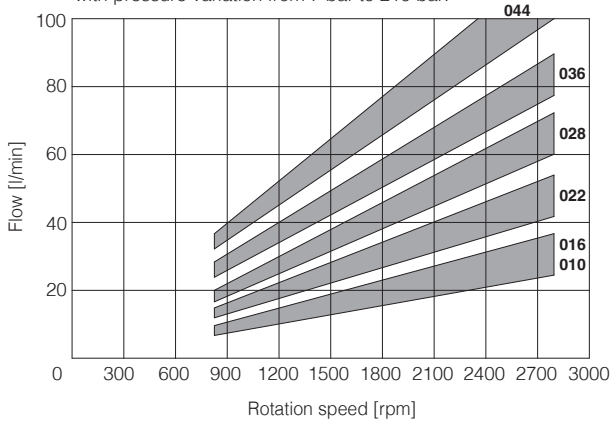
**8 DIAGRAMS** for PFEA -31, 41, 51 (based on mineral oil ISO VG 46 at 50°C)



**PFEA-31:**

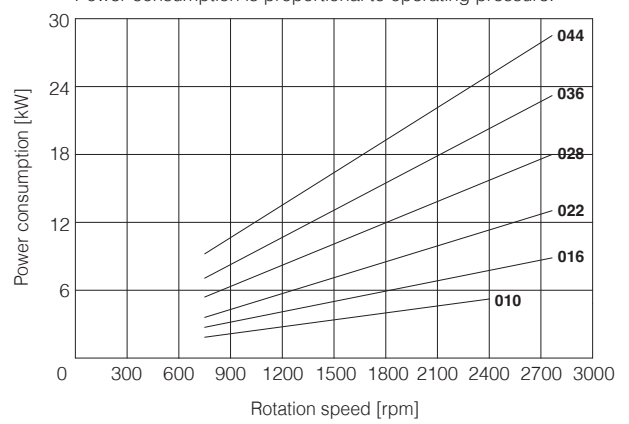
**Flow versus speed diagram**

with pressure variation from 7 bar to 210 bar.



**Power consumption versus speed diagram at 140 bar.**

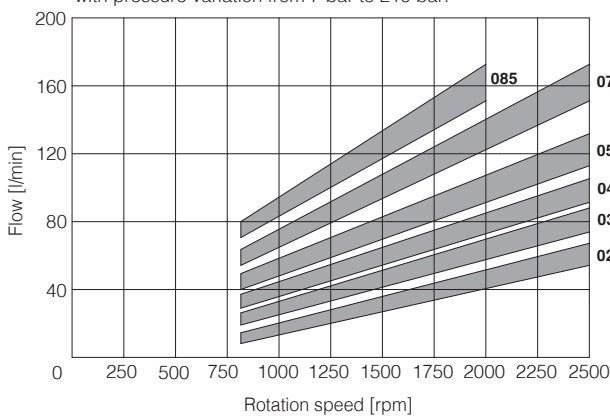
Power consumption is proportional to operating pressure.



**PFEA-41:**

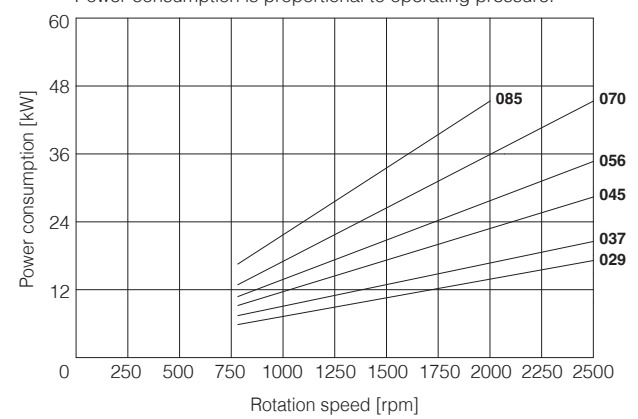
**Flow versus speed diagram**

with pressure variation from 7 bar to 210 bar.



**Power consumption versus speed diagram at 140 bar.**

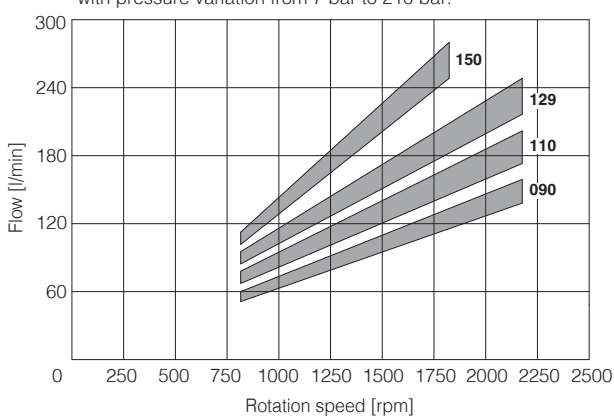
Power consumption is proportional to operating pressure.



**PFEA-51:**

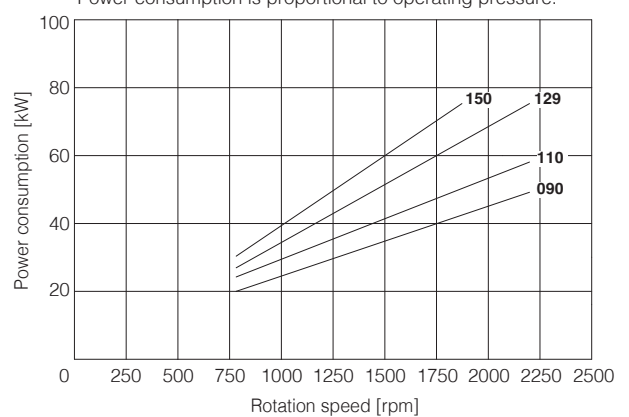
**Flow versus speed diagram**

with pressure variation from 7 bar to 210 bar.

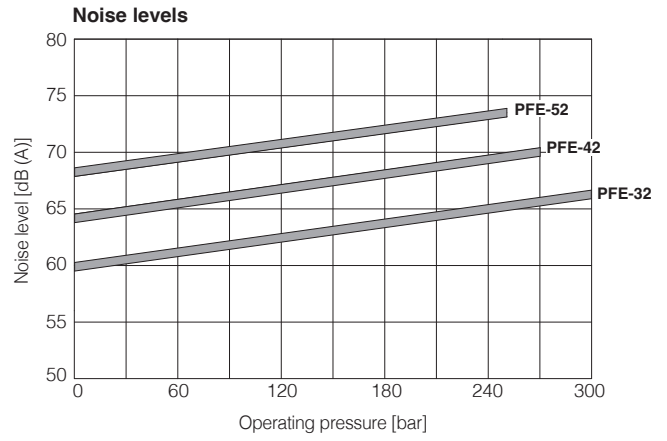
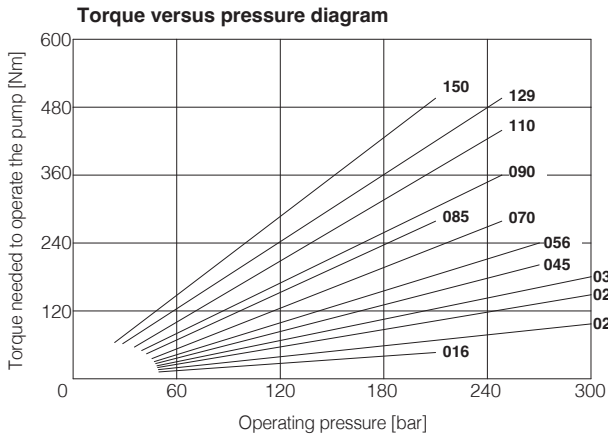


**Power consumption versus speed diagram at 140 bar.**

Power consumption is proportional to operating pressure.



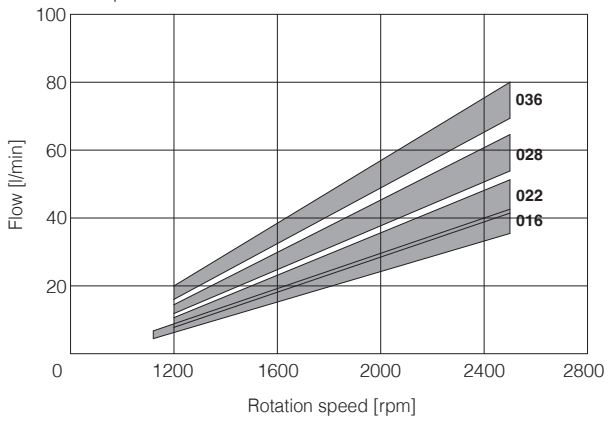
**9 DIAGRAMS** for PFEA -32, 42, 52 (based on mineral oil ISO VG 46 at 50°C)



**PFEA-32:**

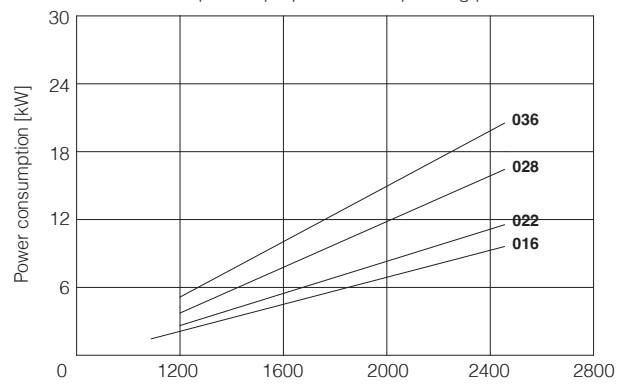
**Flow versus speed diagram**

with pressure variation from 7 bar to 210 bar.



**Power consumption versus speed diagram at 140 bar.**

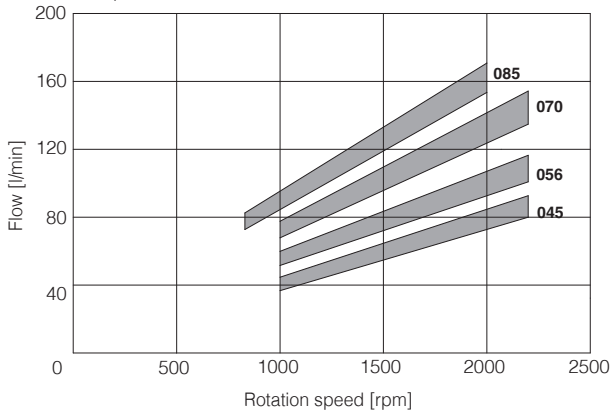
Power consumption is proportional to operating pressure.



**PFEA-42:**

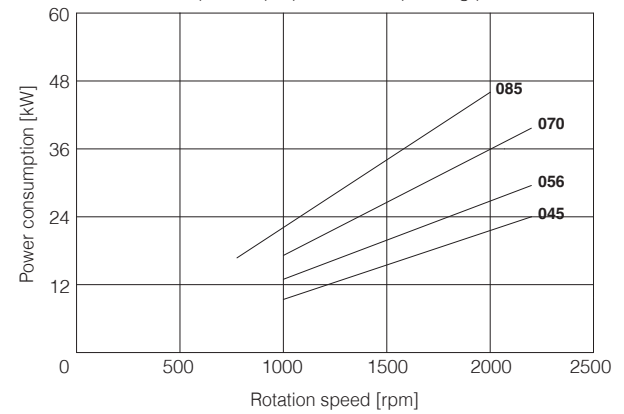
**Flow versus speed diagram**

with pressure variation from 7 bar to 210 bar.



**Power consumption versus speed diagram at 140 bar.**

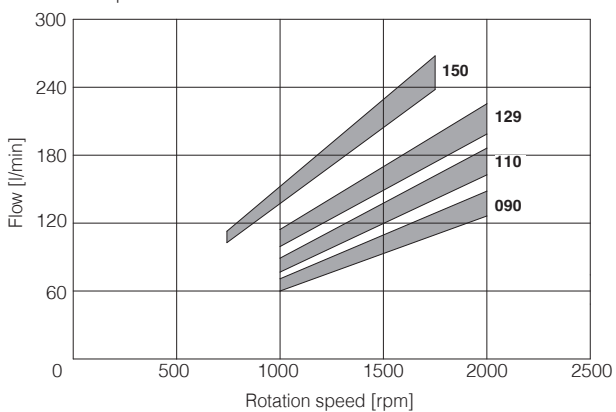
Power consumption is proportional to operating pressure.



**PFEA-52:**

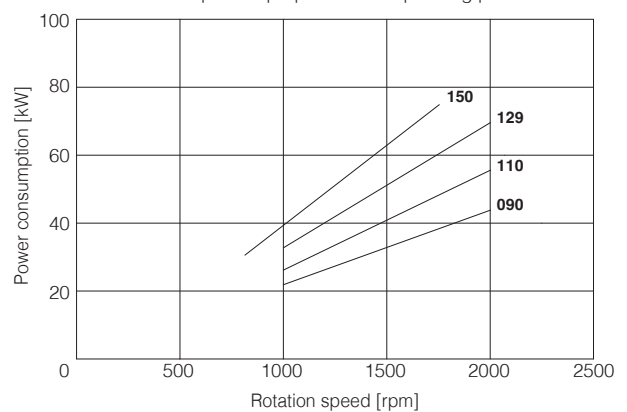
**Flow versus speed diagram**

with pressure variation from 7 bar to 210 bar.



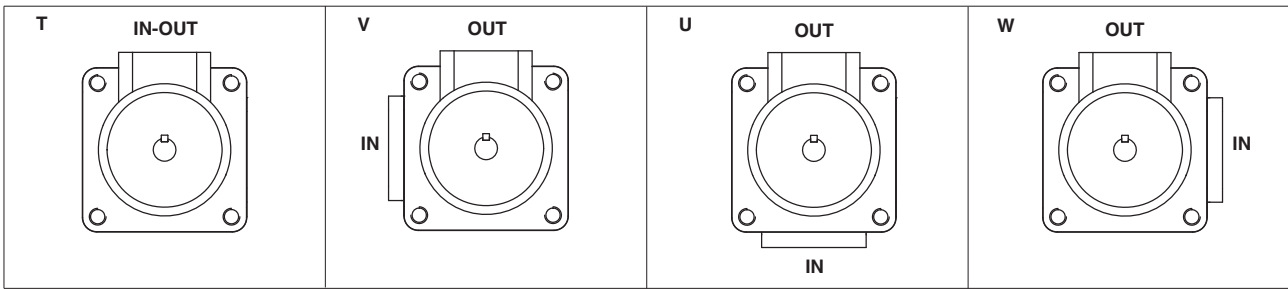
**Power consumption versus speed diagram at 140 bar.**

Power consumption is proportional to operating pressure.



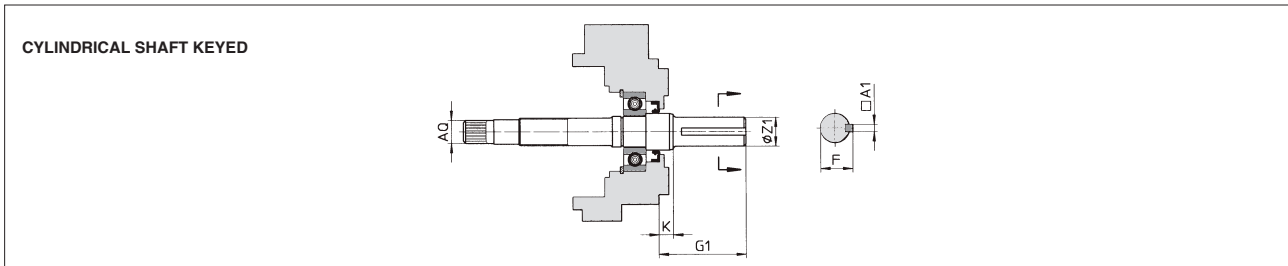
## 10 PORT ORIENTATION

Single pumps can be supplied with oil ports oriented in different configuration in relation to the drive shaft, as follows (viewed from the shaft end); Ports orientation can be easily changed by rotating the pump body that carries inlet port.

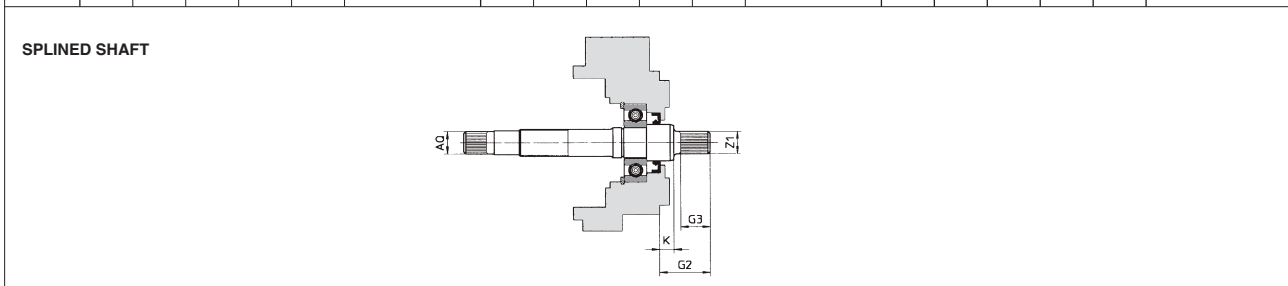


OUT = outlet port; IN = inlet port

## 11 DRIVE SHAFT



PFEA Model	PFEA - 31,41,51						PFEA - 41,51						ALL VERSIONS					
	Keyed shaft type 1 (only PFEA - 31,41,51)						Keyed shaft type 2 (only PFEA - 41,51)						Keyed shaft type 3					
	A1	F	G1	K	ØZ1	Only for through shaft execution Ø AQ	A1	F	G1	K	ØZ1	Only for through shaft execution Ø AQ	A1	F	G1	K	ØZ1	Only for through shaft execution Ø AQ
31,32	4,78	21,11	56,00	8,00	19,05	SAE 16/32-9T	-	-	-	-	-	-	4,78	24,54	56,00	8,00	22,22	SAE 16/32-9T
	4,75	20,94			19,00								4,75	24,41			22,20	
41,42	4,78	24,54	59,00	11,40	22,22	SAE 32/64-24T	6,36	25,03	71,00	8,00	22,22	SAE 32/64-24T	6,38	28,30	78,00	11,40	25,38	SAE 32/64-24T
	4,75	24,41			22,20		6,35	24,77			22,20		6,35	28,10			25,36	
51,52	7,97	35,33	73,00	14	31,75	SAE 16/32-13T	7,95	35,33	84,00	8,10	31,75	SAE 16/32-13T	7,97	38,58	84,00	14	34,90	SAE 16/32-13T
	7,94	35,07			31,70		7,94	35,07			31,70		7,94	38,46			34,88	



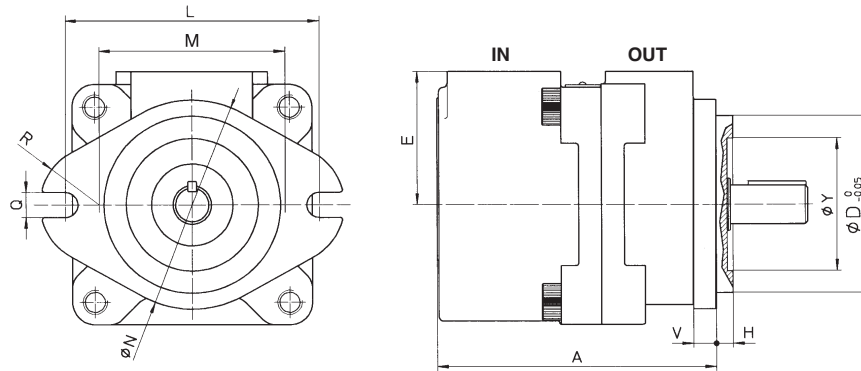
PFEA Model	Splined shaft type 5					Splined shaft type 6					Splined shaft type 7				
	G2	G3	K	Z1	Only for through shaft execution Ø AQ	G2	G3	K	Z1	Only for through shaft execution Ø AQ	G2	G3	K	Z1	Only for through shaft execution Ø AQ
31,32	32,00	19,50	6,50	SAE 16/32-9T	SAE 16/32-9T	41,00	28	8,00	SAE 16/32-13T	SAE 16/32-9T	32,00	19	8,00	SAE 16/32-13T	SAE 16/32-9T
41,42	41,25	28	8,00	SAE 16/32-13T	SAE 32/64-24T	55,60	42	8,00	SAE 12/24-14T	SAE 32/64-24T	41,60	28	8,00	SAE 12/24-14T	SAE 32/64-24T
51,52	56,00	42	8,10	SAE 12/24-14T	SAE 16/32-13T	-	-	-	-	-	-	-	-	-	-

## 12 LIMITS OF SHAFT TORQUE

PFEA Model	Maximum driving torque [Nm]						Maximum torque available at the end of the through shaft [Nm]
	Shaft type 1	Shaft type 2	Shaft type 3	Shaft type 5	Shaft type 6	Shaft type 7	Any type of shaft
31,32	160	-	240	110	240	240	130
41,42	250	250	400	200	400	400	250
-51,52	500	500	850	450	-	-	400

The values of torque required to operate the pumps are shown for each type on the "torque versus pressure" diagram at section 4. In multiple pumps the total torque applied to the shaft of the first element (drive shaft) is the sum of the single torque needed for operating each single pump and it is necessary to verify that this total torque applied to the drive shaft is not higher than the values indicated in the table.

13 DIMENSIONS OF PFEA - 31, 41, 51 SINGLE PUMPS [mm]

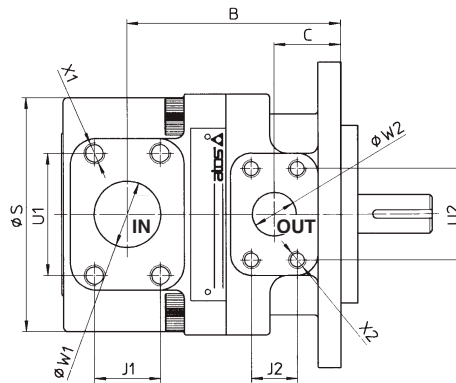


**PORTS DIMENSION (SAE 3000)**

**PFEA-31:** IN = 1 1/4"; OUT = 3/4"  
**PFEA-41:** IN = 1 1/2"; OUT = 1"  
**PFEA-51:** IN = 2"; OUT = 1 1/4"

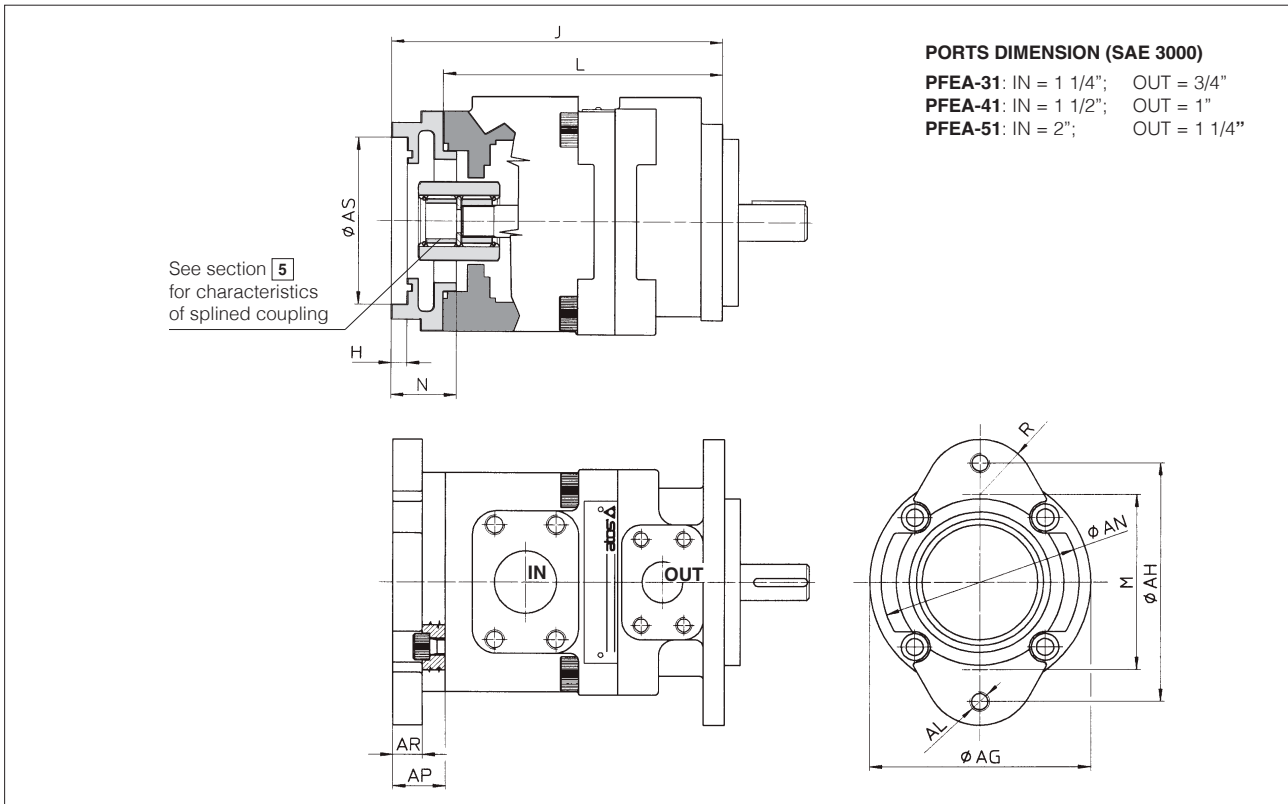
**Mass:**

PFEA-31 = 9 kg  
 PFEA-41 = 14 kg  
 PFEA-51 = 25,5 kg



Pump size	A	B	C	ØD	E	H	L	M	ØN	Q	R
<b>PFEA-31</b>	136	100	28	82,55	70	6,4	106	73	95	11,1	28,5
<b>PFEA-41</b>	160	120	38	101,6	76,2	9,7	146	107	120	14,3	34
<b>PFEA-51</b>	186,5	125	38	127	82,6	12,7	181	143,5	148	17,5	35
Pump size	ØS	U1	U2	V	ØW1	ØW2	J1	J2	X1	X2	ØY
<b>PFEA-31</b>	114	58,7	47,6	10	32	19	30,2	22,2	M10X20	M10X17	47
<b>PFEA-41</b>	134	70	52,4	13	38	25	35,7	26,2	M12X20	M10X17	76
<b>PFEA-51</b>	160	77,8	58,7	15	51	32	42,9	30,2	M12X20	M10X20	76

14 DIMENSIONS OF PFEA-31, 41, 51 WITH THROUGH-SHAFT (XA\*, XB\*, XC options) [mm]



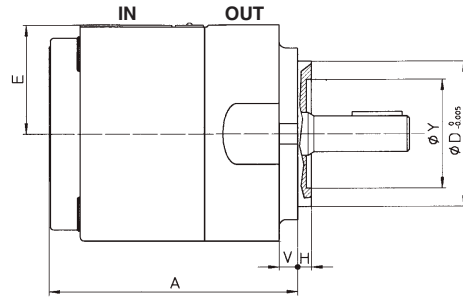
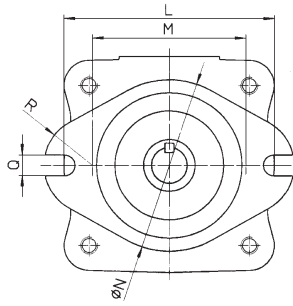
For other dimensions, see section 10

Pump size	Ø AG	Ø AH	AL	Tightening torque (Nm) <sup>(1)</sup>	Ø AN	AP	AR	Ø AS	H	J	L	M	N	R
PFEAXA-31	114	106	M10X17	70	95	33	25	82,57 82,63	6,42 6,47	165,5	132,5	79	32	28,5
PFEAXA-41	134	106	M10X17	70	95	23	11	82,57 82,63	6,42 6,47	194	171	73	32	28,5
PFEAXB-41	134	146	M12	125	120	32	18	101,62 101,68	9,73 9,78	203	171	107	41	34
PFEAXA-51	134	106	M10X17	70	95	22,7	11	82,57 82,63	6,42 6,47	206,2	183,5	73	32	28,5
PFEAXB-51	134	146	M12	125	120	32	18	101,62 101,68	9,73 9,78	215,5	183,5	107	41	34
PFEAXC-51	134	181	M16	300	148	46,5	30,7	127,02 127,02	12,73 12,78	230	183,5	143,5	56	35

(1) Tightening torque for screw class 12.9



15 DIMENSIONS OF PFEA - 32, 42, 52 SINGLE PUMPS [mm]

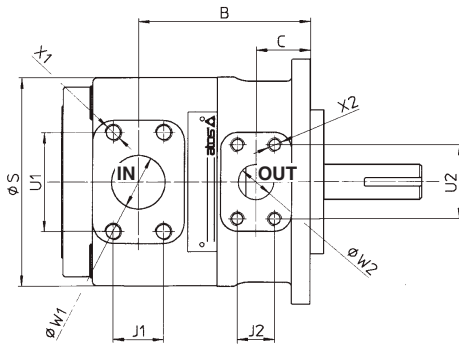


**PORTS DIMENSION (SAE 3000)**

**PFEA-32:** IN = 1 1/4"; OUT = 3/4"  
**PFEA-42:** IN = 1 1/2"; OUT = 1"  
**PFEA-52:** IN = 2"; OUT = 1 1/4"

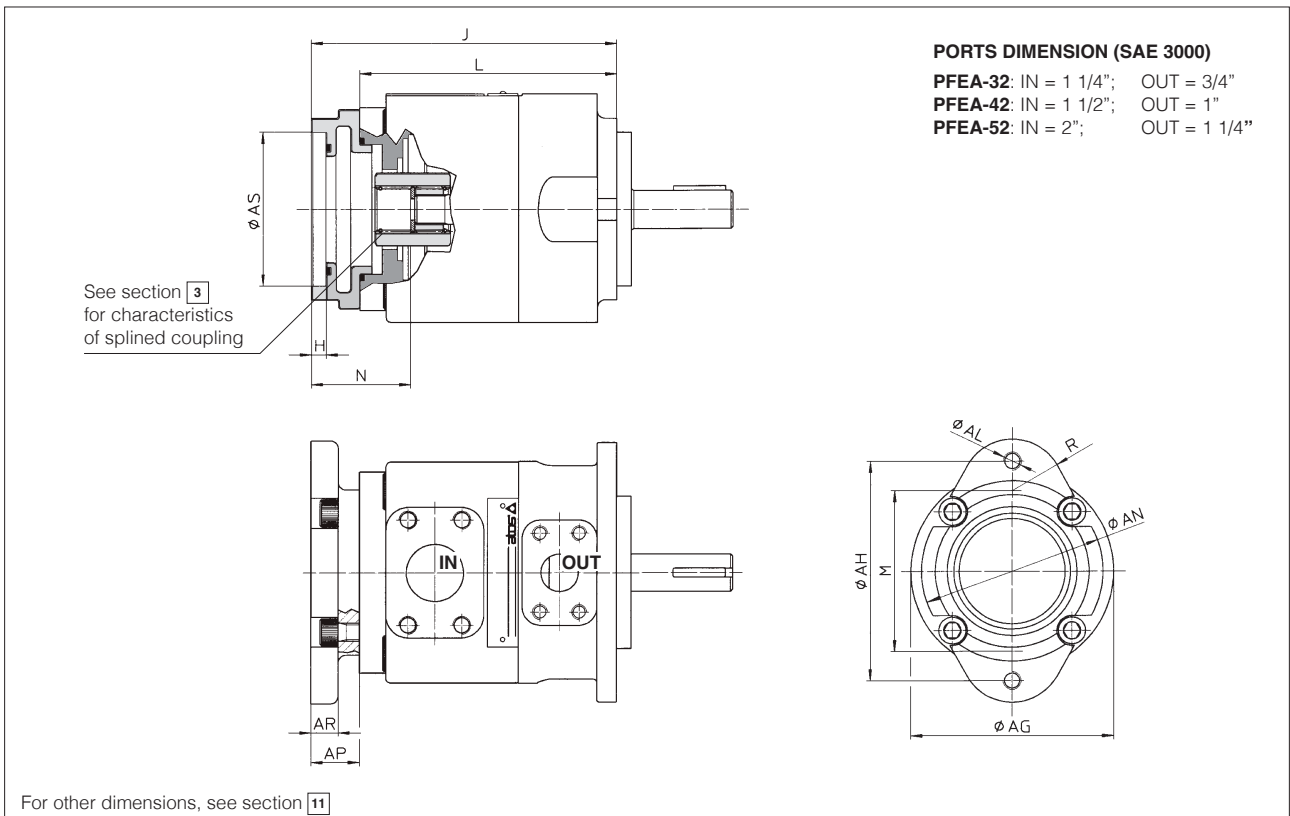
**Mass:**

PFEA-32 = 9 kg  
 PFEA-42 = 20,5 kg  
 PFEA-52 = 32,1 kg



Pump size	A	B	C	ØD	E	H	L	M	ØN	Q	R
PFEA-32	136	100	28	82,5	70	6,4	106	73	95	11	28,5
PFEA-42	175,5	121	38	101,6	78	9,7	146	107	121	14,3	34
PFEA-52	189	125	38	127	89	12,7	181	143,5	148	17,5	35
Pump size	ØS	U1	U2	V	ØW1	ØW2	J1	J2	X1	X2	ØY
PFEA-32	114	58,7	47,6	10	32	19	30,2	22,2	M10X20	M10X17	47
PFEA-42	148	70	52,4	13	38	25	35,7	26,2	M12X20	M10X17	76
PFEA-52	174	77,8	58,7	16,3	50	50	42,9	30,2	M12X20	M10X20	76

**16 DIMENSIONS OF PFEA - 32, 42, 52 WITH THROUGH-SHAFT (XA\*, XB\*, XC\* options) [mm]**



Pump size	Ø AG	Ø AH	AL	Tightening torque (Nm) <sup>(1)</sup>	Ø AN	AP	AR	Ø AS	H	J	L	M	N	R
PFEAXA-32	114	106	M10X17	70	95	33	25	82,57 82,63	6,42 6,47	193,7	132,5	79	32	28,5
PFEAXA-42	134	106	M10X17	70	95	22,7	11	82,57 82,63	6,42 6,47	194	171	73	34	28,5
PFEAXB-42	134	146	M12	125	120	32	18	101,62 101,68	9,73 9,78	203	171	107	43	34
PFEAXA-52	134	106	M10X17	70	95	22,7	11	82,57 82,63	6,42 6,47	206,2	183,5	73	34,5	28,5
PFEAXB-52	134	146	M12	125	120	32	18	101,62 101,68	9,73 9,78	215,5	183,5	107	43,8	34
PFEAXC-52	134	181	M16	300	148	46,7	30,7	127,02 127,02	12,73 12,78	230,2	183,5	143,5	58,5	35

(1) Tightening torque for screw class 12.9

**17 RELATED DOCUMENTATION**

<b>X010</b>	Basics for electrohydraulics in hazardous environments
<b>X020</b>	Summary of Atos ex-proof components certified to ATEX, IECEx, EAC, CCC, PESO
<b>AX900</b>	Operating and maintenance information for ex-proof pumps