

A

MILLING

Overview

Face milling

Hi-feed milling

Shoulder milling

Profile milling

Hardmill

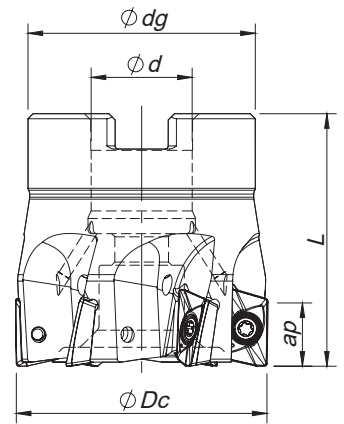
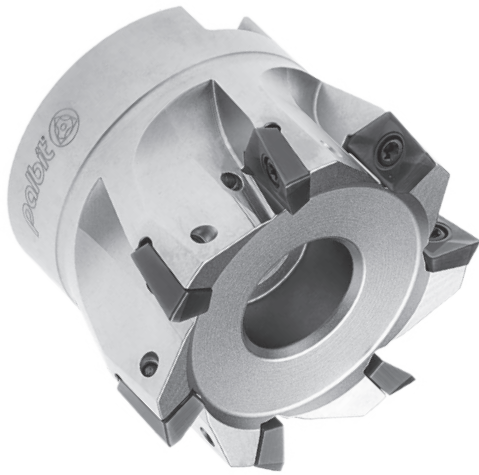
Center & Chamfer

Spot face

Spare Parts

Technical Data

End Mills



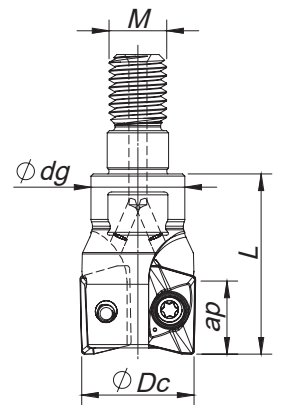
Arbor Mounting

$K_r=90^\circ$ | $\gamma_p=+8^\circ$

Order code Código	Reference Referência Referencia		Dimensions Dimensões Dimensiones (mm)				Kg	Max ap (mm)			Arbor Style	Insert Pastilha Inserto	Stock
			ϕDc	ϕd	ϕdg	L		LP/MP/LN	HF	MH			
181088600	040A20190-06-08-016040		40	16	36	40	0,22	10,0	0,80	3,00	A	XP... 1003...	
181088700	050A20190-07-08-022040		50	22	42	40	0,31	10,0	0,80	3,00	A	XP... 1003...	
181088800	063A20190-08-08-022040		63	22	52	40	0,43	10,0	0,80	3,00	A	XP... 1003...	

Stock item | Produto de stock | Itens de stock

Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Threaded Coupling

$K_r=90^\circ$ | $\gamma_p=+5^\circ \sim +6^\circ$

Order code Código	Reference Referência Referencia		Dimensions Dimensões Dimensiones (mm)				Kg	Max ap (mm)			Insert Pastilha Inserto	Stock
			ϕDc	ϕM	ϕdg	L		LP/MP/LN	HF	MH		
181088200	016R20190-02-05-M08025		16	M8	14	25	0,03	10,0	0,80	3,00	XP... 1003...	
181088300	020R20190-03-05-M10030		20	M10	18	30	0,06	10,0	0,80	3,00	XP... 1003...	
181088400	025R20190-04-05-M12035		25	M12	21	35	0,12	10,0	0,80	3,00	XP... 1003...	
181088500	032R20190-05-06-M16035		32	M16	29	35	0,15	10,0	0,80	3,00	XP... 1003...	
181149100	040R20190-06-08-M16043		40	M16	29	43	0,25	10,0	0,80	3,00	XP... 1003...	

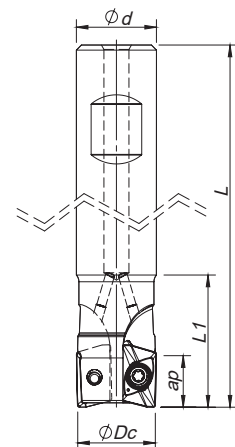
Stock item | Produto de stock | Itens de stock

Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Weldon Shank

$K_r=90^\circ$ | $\gamma_p=+5^\circ\sim 8^\circ$



Order code Código	Reference Referência Referencia		Dimensions Dimensões Dimensiones (mm)				Kg	Max ap (mm)			Insert Pastilha Inserto	Stock
			ØDc	Ød	L	L1		LP/MP/LN	HF	MH		
181087900	016W20190-02-05-016085	2	16	16	85	32	0,10	10,0	0,80	3,00	XP... 1003...	
181100600	016W20190-02-05-016150	2	16	16	150	70	0,13	10,0	0,80	3,00	XP... 1003...	
181108600	017W20190-02-05-016150	2	17	16	150	36	0,14	10,0	0,80	3,00	XP... 1003...	
181088000	020W20190-03-05-020090	3	20	20	90	28	0,21	10,0	0,80	3,00	XP... 1003...	
181100700	020W20190-03-05-020150	3	20	20	150	70	0,26	10,0	0,80	3,00	XP... 1003...	
181108700	022W20190-03-05-020150	3	22	20	150	70	0,30	10,0	0,80	3,00	XP... 1003...	
181088100	025W20190-04-05-025095	4	25	25	95	30	0,33	10,0	0,80	3,00	XP... 1003...	
181100800	025W20190-04-05-025150	4	25	25	150	80	0,36	10,0	0,80	3,00	XP... 1003...	
181108800	027W20190-04-05-025150	4	27	25	150	80	0,38	10,0	0,80	3,00	XP... 1003...	
181085400	032W20190-04-08-032110	4	32	32	110	50	0,55	10,0	0,80	3,00	XP... 1003...	

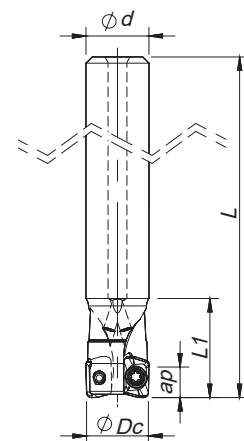
Stock item | Produto de stock | Itens de stock

Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Cylindrical Shank

$K_r=90^\circ$ | $\gamma_p=+4^\circ$



Order code Código	Reference Referência Referencia		Dimensions Dimensões Dimensiones (mm)				Kg	Max ap (mm)			Insert Pastilha Inserto	Stock
			ØDc	Ød	L	L1		LP/MP/LN	HF	MH		
181171700	016E20190-02-05-016085	2	16	16	85	32	0,10	10,0	0,8	3,0	XP...1003...	
181173000	016E20190-02-05-016150	2	16	16	150	70	0,13	10,0	0,8	3,0	XP...1003...	
181171600	020E20190-03-05-020090	3	20	20	90	28	0,21	10,0	0,8	3,0	XP...1003...	
181171800	020E20190-03-05-020150	3	20	20	150	70	0,26	10,0	0,8	3,0	XP...1003...	
181171400	025E20190-04-05-025095	4	25	25	95	30	0,33	10,0	0,8	3,0	XP...1003...	
181172900	025E20190-04-05-025150	4	25	25	150	80	0,36	10,0	0,8	3,0	XP...1003...	

Stock item | Produto de stock | Itens de stock

Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

LINEPRO 20190

XP... 1003... | Inserts | Pastilhas | Plaquetas

A

MILLING

Overview

Face milling

Hifeed milling

Shoulder milling

Profile milling

Hardmill

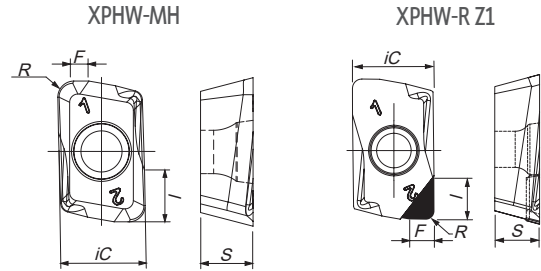
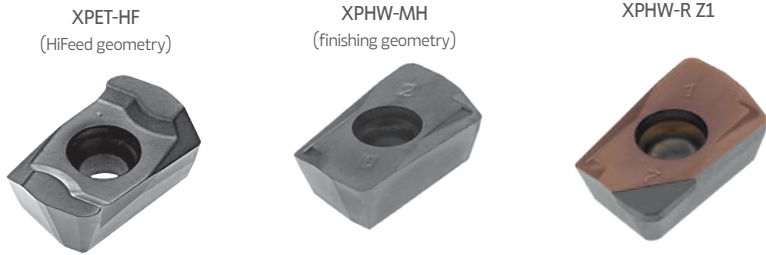
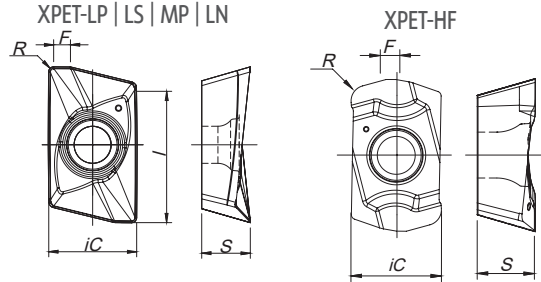
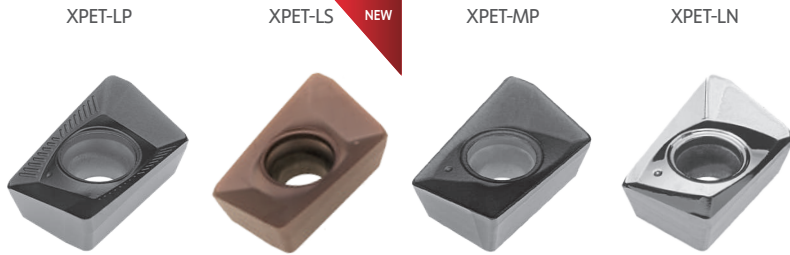
Center & Chamfer

Spotface

Spare Parts

Technical Data

End Mills



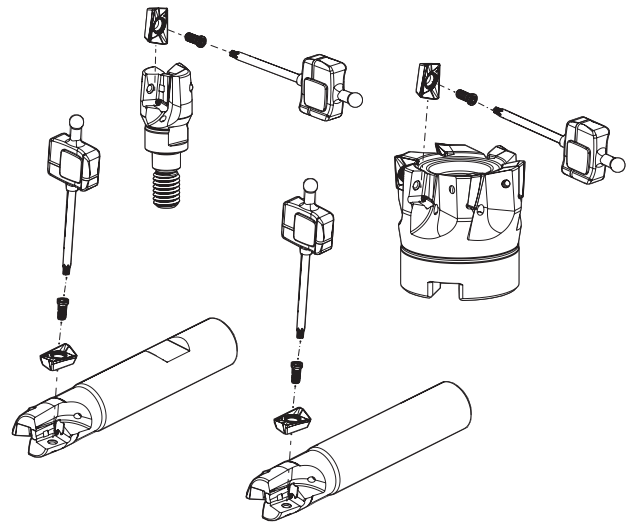
(1) Geometry code	(2) Grade code	P		M	K			N	S	H	Dimensions Dimensões Dimensiones (mm)											
		CVD	PVD			PVD	CVD	PVD		UNC	PCD	PVD	PVD	iC	S	I	R	F				
		T9	G1	X5	T1	P4	X9	L5	L9	X5	T1	P4	10						D6	X9	X4	X6
1113132	XPET 100302 PDER-LP																	6,95	3,96	10,50	0,20	1,50
1111980	XPET 100304 PDER-LP																	6,95	3,96	10,50	0,40	1,30
1111981	XPET 100308 PDER-LP																	6,95	3,96	10,50	0,80	1,40
1112022	XPET 100316 PDER-LP																	6,95	3,96	10,50	1,60	0,80
1113365	XPET 100304 PDER-LS																	6,95	3,96	10,5	0,40	1,90
1112197	XPET 100308 PDER-LS																	6,95	3,96	10,5	0,80	1,50
1113358	XPET 100312 PDER-LS																	6,95	3,96	10,5	1,20	1,00
1113366	XPET 100316 PDER-LS																	6,95	3,96	10,5	1,60	0,80
1113359	XPET 100320 PDER-LS																	6,95	3,96	10,5	2,00	1,60
1113360	XPET 100332 PDER-LS																	6,95	3,96	10,5	3,20	0,50
1113394	XPET 100340 PDER-LS																	6,95	3,96	10,5	4,00	0,20
1111982	XPET 100304 PDSR-MP																	6,95	3,96	10,50	0,40	1,10
1111983	XPET 100308 PDSR-MP																	6,95	3,96	10,50	0,80	1,35
1111984	XPET 100304 PDFR-LN																	6,95	3,96	10,50	0,40	0,75
1112906	XPET 100308 PDFR-LN																	6,95	3,96	10,50	0,80	1,05
1111985	XPET 100312 PDFR-LN																	6,95	3,96	10,50	1,20	0,75
1112376	XPET 100312 ZDR-HF																	6,95	3,96	-	1,20	1,50
1112500	XPHW 100308 ZER-MH																	6,95	3,60	3,00	0,80	1,30
1112736	XPHW 100310 ZER-MH																	6,95	3,60	3,00	1,00	0,35
1112735	XPHW 100320 ZER-MH																	6,95	3,60	3,00	1,20	1,10
1112556	XPHW 100308 R Z1																	6,95	3,60	3,80	0,80	2,30

⊗ First choice | Primeira opção | 1ª opción
 ⊗ Stock item | Produto de stock | Itens de stock
 ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9)
 Insert order code = (1) Geometry Code + (2) Grade Code

SPARE PARTS | Acessórios | Repuestos

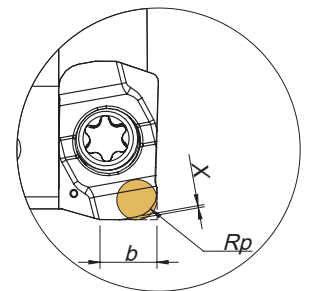
Cutter ØDc	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A20190 - 40-63	P0250704	XT08	DT0812	1,2
R20190 - 16	P0250503	XT08	DT0812	1,2
R20190 - 20-40	P0250704	XT08	DT0812	1,2
W20190 - 16-17	P0250503	XT08	DT0812	1,2
W20190 - 20-32	P0250704	XT08	DT0812	1,2
E20190 - 16	P0250503	XT08	DT0812	1,2
E20190 - 20-25	P0250704	XT08	DT0812	1,2

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-241.
Check the procedures for the clamping screws on the page A-241.



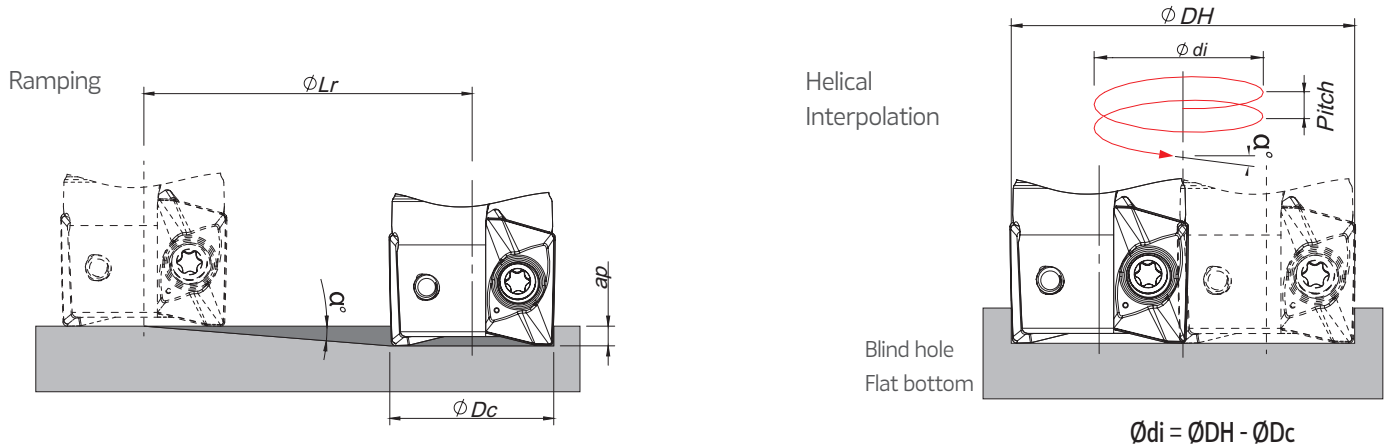
PROGRAMMING DATA | Dados para programação | Datos para la programación

Insert	Programming Data		
	Rp	X	b
XPET 10 HF	1,6	0,33	3,45



RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular



ϕDc	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min Lr	Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
				ϕDH_{min}	ϕDH_{max}	
16	7,5	10,0	76,0	27,6 -	- 30,4	4,8 6,0
17	7,0	10,0	81,4	29,6 -	- 32,4	4,9 5,9
20	5,0	10,0	114,3	35,6 -	- 38,4	4,3 5,1
22	4,5	10,0	127,1	39,6 -	- 42,4	4,3 5,0
25	3,5	10,0	163,5	45,6 -	- 48,4	4,0 4,5
27	3,0	10,0	190,8	49,6 -	- 52,4	3,7 4,2
32	2,5	10,0	229,0	59,6 -	- 62,4	3,8 4,2
40	1,7	10,0	336,9	75,6 -	- 78,4	3,3 3,6
50	1,3	10,0	440,7	95,6 -	- 98,4	3,2 3,4
63	1,0	10,0	572,9	121,6 -	- 124,4	3,2 3,4

(1) using LP insert with radius 0,8 mm

Note: During helical interpolation do not exceed maximum pitch

When using HF insert or other different insert radius to calculate the ϕDH_{min} and ϕDH_{max} use the equation below:

- Minimum Diameter: $\phi DH_{min} = 2 \times (\phi Dc - (R \text{ corner radius} + F \text{ width of edge wiper}))$



- Maximum Diameter: $\phi DH_{max} = 2 \times (\phi Dc - R \text{ corner radius})$

CHIP-BREAKER SELECTION GUIDE | Guia para aplicações do quebra- aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip-Breaker Application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	XPET 10 ... LP/HF	XPET 10 ... MP
	2	Low-Alloyed Steel	220-280	XPET 10 ... LP/HF	XPET 10 ... MP
	3	High-Alloyed Steel	280-380	XPET 10 ... MP/HF	-
M	4	SS - Ferritic / Martensitic	200-330	XPET 10 ... LS	XPET 10 ... LP/HF
	5	SS - Austenitic	200-330	XPET 10 ... LS	XPET 10 ... LP/HF
	6	SS - Austenitic-ferritic (Duplex)	230-260	XPET 10 ... LS	XPET 10 ... LP/HF
K	7	Malleable Cast Iron	130-230	XPET 10 ... LP/HF	XPET 10 ... MP
	8	Grey Cast Iron	180-245	XPET 10 ... MP/HF	-
	9	Nodular Cast iron	160-250	XPET 10 ... MP/HF	-
N	10	Aluminium and Non Ferrous	30-130	XPET 10 ... LN/R Z1	-
S	11	Heat Resistant Super Alloys	200-320	XPET 10 ... LS	XPET 10 ... LP/HF
H	12	Hardened Steels	40-55 HRC	XPHW 10 ... MH	-

GRADES SELECTION GUIDE | Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades							PCD		
				← Wear Resistance				Toughness →					
				PH0910	PH5705	PHH603	PHP910	PHP920	PHP930	PHH930		PH5740	PHS740
P	1	Unalloyed Steel	125-220	●	●	●	●	●	●	●	●	●	
	2	Low-Alloyed Steel	220-280				●	●	●			●	
	3	High-Alloyed Steel	280-380			●	●	●	●			●	
M	4	SS - Ferritic / Martensitic	200-330							●			
	5	SS - Austenitic	200-330							●			
	6	SS - Austenitic-ferritic (Duplex)	230-260							●			
K	7	Malleable Cast Iron	130-230		●		●	●	●		●		
	8	Grey Cast Iron	180-245		●		●	●	●		●		
	9	Nodular Cast iron	160-250		●		●	●	●		●		
N	10	Aluminium and Non Ferrous	30-130	●								●	
S	11	Heat Resistant Super Alloys	200-320							●			
H	12	Hardened Steels	40-55 HRC			●							

 Good Conditions
  Average Conditions
  Difficult Conditions

LINEPRO 20190

RECOMMENDED CUTTING CONDITIONS | Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)									PCD
				← Wear Resistance						Toughness →			
				PH0910	PH5705	PHH603	PHP910	PHP920	PHP930	PHH930	PH5740	PHS740	
P	1	Unalloyed Steel	125-220	-	-	-	180-250	180-250	160-230	-	-	140-220	-
	2	Low-Alloyed Steel	220-280	-	-	-	160-240	160-230	140-210	-	-	120-200	-
	3	High-Alloyed Steel	280-380	-	-	180-310	140-230	140-220	120-200	-	-	100-190	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	-	-	140-210	-	-	-
	5	SS - Austenitic	200-330	-	-	-	-	-	-	120-170	-	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	-	-	100-150	-	-	-
K	7	Malleable Cast Iron	130-230	-	160-290	-	180-300	160-270	150-250	-	160-260	-	-
	8	Grey Cast Iron	180-245	-	170-320	-	160-250	140-250	140-230	-	140-240	-	-
	9	Nodular Cast iron	160-250	-	140-200	-	150-210	120-210	100-200	-	120-200	-	-
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	-	-	-	-	800-3000
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	-	30-110	-	-	-
H	12	Hardened Steels	40-55 HRC	-	-	70-270	-	-	-	-	-	-	-

(Note 1): Cutting conditions $a_e/D_c=70\%$.

(Note 2): PH5... and PHS... can be used wet or dry. PH7... use only air.

(Note 3):

Operation	a_e	Vc & fz	a_p (mm)
Slotting	100%	<20%	2,0-4,0
Shouldering	<50%	>8%	3,0-6,0
	≤25%	>12%	7,0-9,0

(Note 4):

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:

- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

Feed fz (mm/t)						
XPET 10... LP	XPET 10... LS	XPET 10... MP	XPET 10... LN	XPET 10... HF	XPHW 10... R Z1	XPHW 10... MH
0,08-0,20	-	0,10-0,25	-	0,40-0,80	-	0,10-0,25
0,08-0,20	-	0,10-0,20	-	0,40-0,80	-	0,10-0,25
0,08-0,15	-	0,10-0,20	-	0,40-0,60	-	0,10-0,25
0,08-0,20	0,08-0,20	0,10-0,20	-	0,40-0,70	-	-
0,08-0,20	0,08-0,20	0,10-0,20	-	0,40-0,70	-	-
0,08-0,15	0,08-0,15	0,10-0,20	-	0,40-0,60	-	-
0,08-0,20	-	0,10-0,25	-	0,50-0,80	-	-
0,08-0,20	-	0,10-0,25	-	0,50-0,80	-	-
0,08-0,20	-	0,10-0,20	-	0,50-0,60	-	-
-	-	-	0,07-0,25	-	0,10-0,25	-
0,05-0,07	0,05-0,07	-	-	0,40-0,60	-	-
-	-	-	-	-	-	0,08-0,15

