Bearing selection

Claron produce four main types of polymer bearings for use in hydraulic cylinder applications. Each has a varying set of properties to cover a wide range of applications. The following tables are designed to help select the correct type for a given application.

Table 1 shows the properties for each type of bearing. Values shown as low/high should be interpreted as relative to each other.

	BGF	BT	EBR	PBR
Material	Modified & Filled PA	Bronze Filled PTFE	POM	Reinforced Phenolic
Max Operating Temp °C	110	200	110	120
Max Linear Velocity m/s	1.5	15	1	3
Coefficient of friction	0.15	0.06	0.14	0.12
Load Capacity	High	Low	Normal	High
Sevice Life	High	High	Normal	Normal
Relative Cost factor	1.5	3	1	3.5
Production of contamination	Normal	V.Low	Normal	High
Modification of metal finish	High	V.Low	Normal	High
Chemical resistance	Normal	V.High	Normal	Normal

Table 2 shows a summary of recommended uses.

Type	Recommended Uses
BGF	Applications requiring high bearing capacity and long service life.
BT/CT	All applications utilising PTFE based seals. Applications requiring smooth low friction operation. Applications with poor lubrication, or high speeds. Type CT should be used for pneumatic applications or for non-ferrous metals.
EBR	Standard applications requiring a low cost but efficient bearing.
PBR	Applications requiring high bearing capacity at high temperatures, or where the 'dieseling effect' (ignition of vapour) may take place.

To calculate the maximum allowable bearing load in Newtons for a Claron bearing ring used in standard hydraulic cylinder applications, multiply the projected area by the load capacity as follows:-

1) To calculate the projected area multipy the ID of the bearing by its width:-

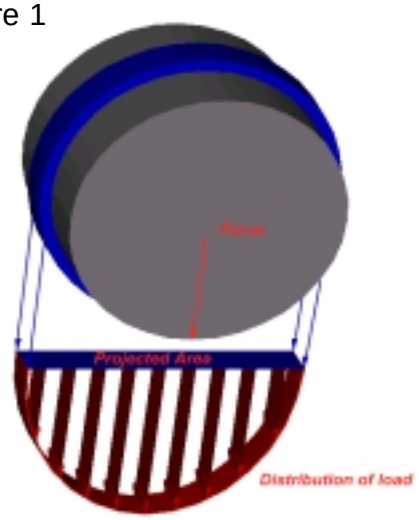
Projected area= ID(mm) x W(mm)

2) Multiply the projected area by the load capacity taken from figure 2 for the required maximum operating temperature.

Bearing Load = Projected Area x Load capacity

Calculation of maximum allowable bearing Load

Figure 1



Note:
Figure 1 shows that the load distribution is not even along the projected area, this however has already been taken into account in the calculation of load capacity in figure 2.

Lubricated applications.
Load Capacity as a function of Temperature

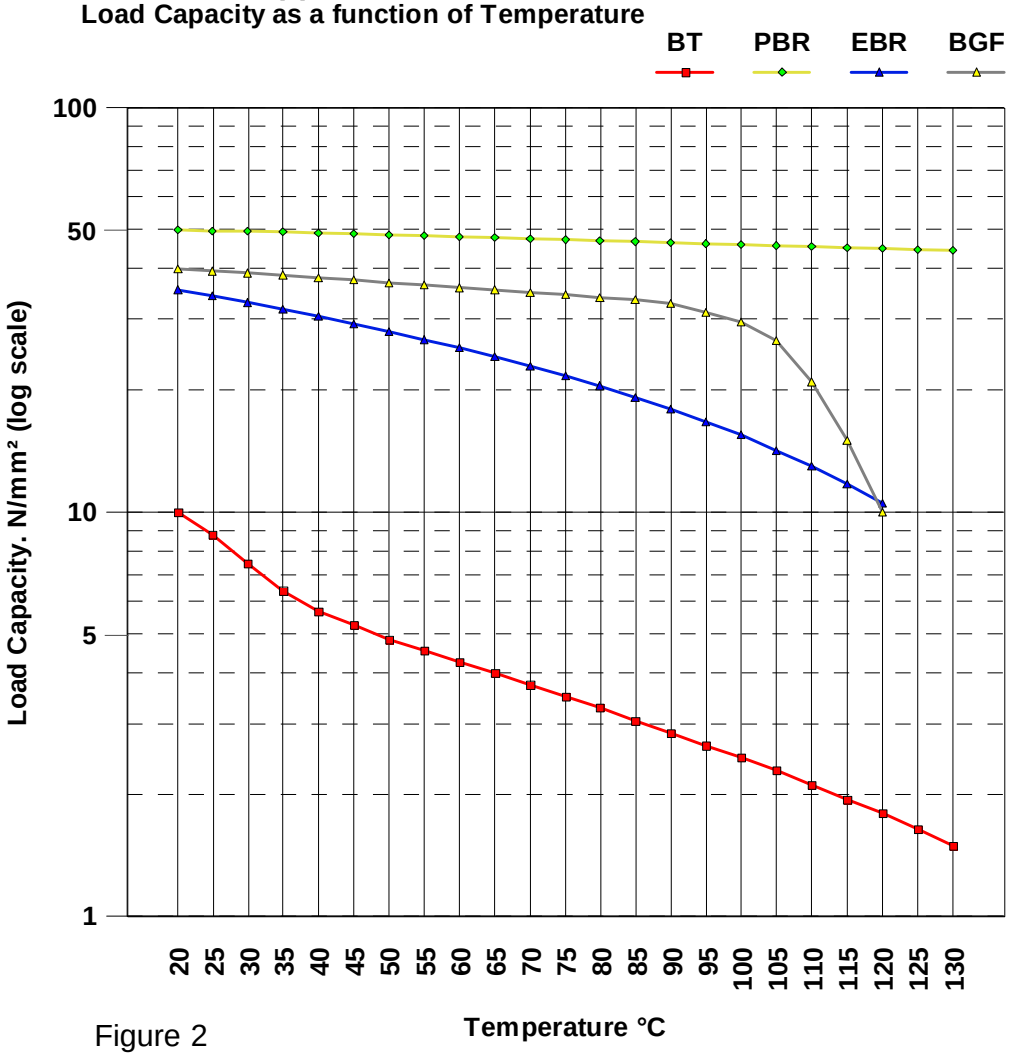


Figure 2

For unlubricated applications Claron recommends the use of Carbon bearing tape CT. See section E2

Design

Claron EBR & IBR bearing rings are designed for use on Pistons or Rods to align Rod and Piston and to prevent metal to metal contact. This bearing is precision moulded from a high performance grade of Polyacetal. These bearing rings are Butt split to facilitate assembly, and to allow the passage of fluid. See the 'selection of bearing rings' at the beginning of this section for further application details.

Operating Conditions

Max. Operating Temp	110°C
Max. Linear Velocity	1 m/sec

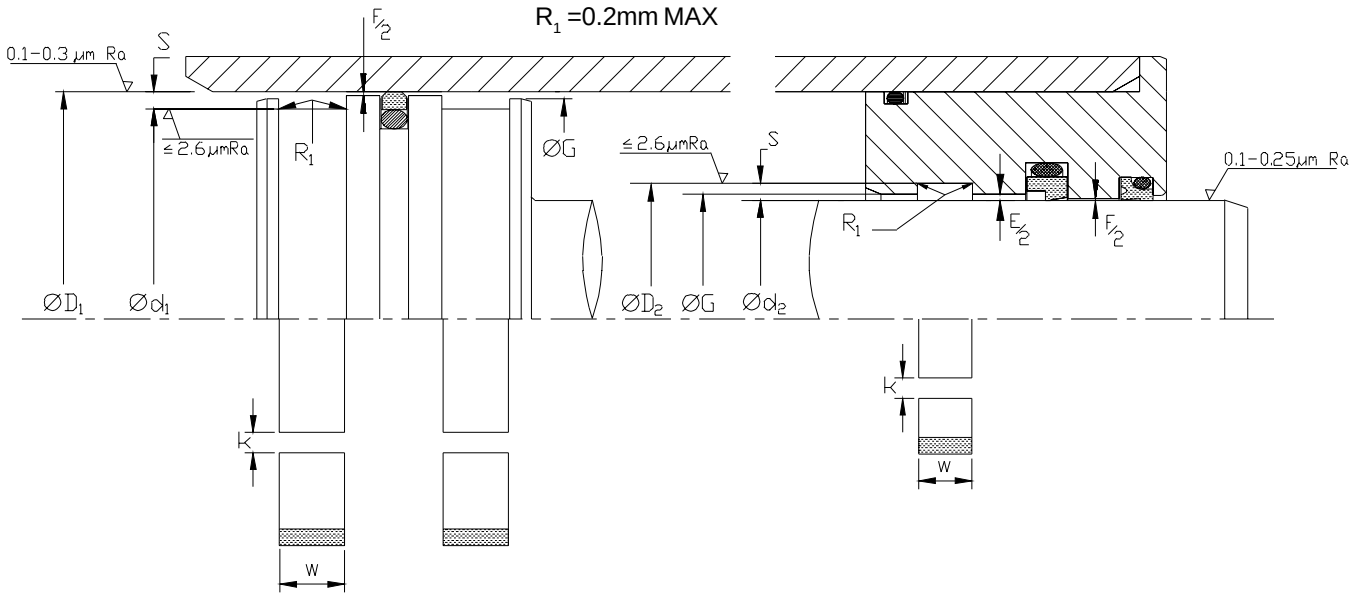
See graph at the beginning of this section for load capacity values

Continuos operating temperature for various fluids

POM Polyacetal		
DIN	**Hydraulic Fluid Description**	**°C**
H	Mineral oil without additives	100
H-L	Mineral Fluid with anti corrosion and anti ageing additives	100
H-LP	Mineral oil as HL plus additives reducing wear, raising load	100
H-LPD	Mineral oil as H-LP but with detergents and dispersants	100
H-V	Mineral oil as H-LP plus improved viscosity temp.	100
HFA E	Emulsions of mineral oil in water. Water content 80-95%	55
HFA S	Synthetic oil in water. Water content 80-95%	55
HFB	Emulsions of water in mineral oil. Water content 40%	60
HFC	Aqueous polymer solutions. Water content 35%	60
HFD R	Phosphoric acid ester based	80
HFD S	Chlorinated hydrocarbon based	80
HFD T	Mixtures of HFD R and HFD S	80
HEPG	Polyglycol based	100
HETG	Vegetable Oil based	60
HEES	Fully synthetic ester based	100

Housing

For surface finish and recommended lead in chamfers refer to the illustration below. For housing dimensions and machining tolerances refer to the catalogue page of selected seal.
Refer to Appendix 4 for value of tolerance symbols.



Fitting

For the bearing to function correctly, it is important that care be taken in fitting the bearing within its housing.
For a detailed checklist, refer to Appendix 3.

Nominal Dimensions & Machining Tolerances

Claron Part Number	H9 $ØD_1$	≤100mm +0.0 -0.05 >100mm +0.0 -0.08 $Ød_1$	±0.20 L_1	±0.40 ØG
EBR 25	25	19	10.0	22
EBR 32	32	26	10.0	29
EBR 40	40	34	10.0	37
EBR 46	46	40	10.0	43
EBR 50	50	44	10.0	47
EBR 50/1	50	44	13.0	47
EBR 55	55	49	13.0	52
EBR 60	60	54	13.0	57
EBR 63	63	57	13.0	60
EBR 65	65	59	13.0	62
EBR 70	70	64	13.0	67
EBR 75	75	69	13.0	72
EBR 80	80	74	13.0	77
EBR 90	90	84	13.0	87
EBR 100	100	94	13.0	97
EBR 110	110	104	13.0	107
EBR 115	115	109	13.0	112
EBR 120	120	114	13.0	117
EBR 120/1	120	114	19.5	117
EBR 125	125	119	13.0	122
EBR 125/1	125	119	19.5	122
EBR 127	127	121	13.0	124
EBR 130	130	124	13.0	127
EBR 140	140	134	13.0	137
EBR 150	150	144	13.0	147
EBR 150/1	150	144	19.5	147
EBR 160	160	154	19.5	157
EBR 170	170	164	19.5	167
EBR 180	180	174	19.5	177
EBR 200	200	194	19.5	197
EBR 220	220	214	19.5	217
EBR 250	250	244	19.5	247

EBR

Imperial

Claron Part Number	Nominal Dimensions & Machining Tolerances			
	H9	≤4.000" +0.000" -0.002" >4.000" +0.000" -0.003"	±0.004	±0.010
	$Ød_1$	$ØD_1$	L_1	ØG
EBR 1000	1.000	0.764	0.393	0.882
EBR 1250	1.250	1.014	0.393	1.132
EBR 1500	1.500	1.264	0.393	1.382
EBR 1750	1.750	1.514	0.393	1.632
EBR 2000	2.000	1.764	0.393	1.882
EBR 2001/1	2.000	1.764	0.512	1.882
EBR 2250	2.250	2.014	0.512	2.132
EBR 2500	2.500	2.264	0.512	2.382
EBR 2625	2.625	2.389	0.512	2.507
EBR 2750	2.750	2.514	0.512	2.632
EBR 3000	3.000	2.764	0.512	2.882
EBR 3250	3.250	3.014	0.512	3.132
EBR 3500	3.500	3.264	0.512	3.382
EBR 3750	3.750	3.514	0.512	3.632
EBR 4000	4.000	3.764	0.512	3.882
EBR 4500	4.500	4.264	0.512	4.382
EBR 4500/1	4.500	4.264	0.768	4.382
EBR 5000	5.000	4.764	0.512	4.882
EBR 5500	5.500	5.264	0.512	5.382
EBR 6000	6.000	5.764	0.512	5.882
EBR 6500	6.500	6.264	0.768	6.382
EBR 7000	7.000	6.764	0.768	6.882
EBR 7250	7.250	7.014	0.768	7.132
EBR 7500	7.500	7.264	0.768	7.382
EBR 8000	8.000	7.764	0.768	7.882
EBR 8250/1	8.250	8.014	0.512	8.132
EBR 8500	8.500	8.264	0.768	8.382
EBR 9000	9.000	8.764	0.768	8.882
EBR 9500	9.500	9.264	0.768	9.382

Nominal Dimensions & Machining Tolerances

Claron Part Number	f8 $Ød_2$	≤115mm +0.05 -0.00 >115mm +0.08 -0.00 $ØD_2$	±0.20 L_1	±0.40 ØG
IBR 020	20	26	10.0	23
IBR 022	22	28	10.0	25
IBR 025	25	31	10.0	28
IBR 028	28	34	10.0	31
IBR 032	32	38	10.0	35
IBR 036	36	42	10.0	39
IBR 040	40	46	10.0	43
IBR 045	45	51	13.0	48
IBR 045/2	45	51	10.0	48
IBR 050	50	56	13.0	53
IBR 056	56	62	13.0	59
IBR 060	60	66	13.0	63
IBR 063	63	69	13.0	66
IBR 070	70	76	13.0	73
IBR 075	75	81	13.0	78
IBR 080	80	86	13.0	83
IBR 090	90	96	13.0	93
IBR 095	95	101	13.0	98
IBR 100	100	106	13.0	103
IBR 100/1	100	106	20.5	103
IBR 110	110	116	13.0	113
IBR 120	120	126	13.0	123
IBR 125	125	131	13.0	128
IBR 125/1	125	131	25.5	128
IBR 130	130	136	13.0	133
IBR 140	140	146	13.0	143
IBR 145	145	151	13.0	148

Nominal Dimensions & Machining Tolerances

Claron Part Number	f8 $Ød_2$	≤4.500" +0.002" -0.000" >4.500" +0.002" -0.000" $ØD_2$	±0.004 L_1	±0.010 ØG
IBR 1000	1.000	1.236	0.393	1.118
IBR 1125	1.125	1.361	0.393	1.243
IBR 1250	1.250	1.486	0.393	1.368
IBR 1375	1.375	1.611	0.393	1.493
IBR 1500	1.500	1.736	0.393	1.618
IBR 1750	1.750	1.986	0.393	1.868
IBR 1750/1	1.750	1.986	0.512	1.868
IBR 2000	2.000	2.236	0.512	2.118
IBR 2125/1	2.125	2.361	0.512	2.243
IBR 2250	2.250	2.486	0.512	2.368
IBR 2375	2.375	2.611	0.512	2.493
IBR 2500	2.500	2.736	0.512	2.618
IBR 2625	2.625	2.861	0.512	2.743
IBR 2750	2.750	2.986	0.512	2.868
IBR 3000	3.000	3.236	0.512	3.118
IBR 3250	3.250	3.486	0.512	3.368
IBR 3375	3.375	3.611	0.512	3.493
IBR 3500	3.500	3.736	0.512	3.618
IBR 3625	3.625	3.861	0.512	3.743
IBR 3750	3.750	3.986	0.512	3.868
IBR 4000	4.000	4.236	0.512	4.118
IBR 4250	4.250	4.486	0.512	4.368
IBR 4375	4.375	4.611	0.512	4.493
IBR 4500	4.500	4.736	0.512	4.618
IBR 4750	4.750	4.986	0.512	4.868
IBR 5000	5.000	5.236	0.512	5.118
IBR 5500	5.500	5.736	0.512	5.618
IBR 5750	5.750	5.986	0.512	5.868
IBR 6000	6.000	6.236	0.767	6.118
IBR 6750	6.750	6.986	0.767	6.868

ClaronPolyseal®

Bearing Tape

BT/CT

Metric

Design

This range of products is designed for use in hydraulic and pneumatic piston and gland applications to minimise the problems of metal to metal contact by inexpensive means. Produced from wear resistant filled grades of PTFE with its known properties of low friction, these products eliminate 'stiction' between moving parts, reduce 'nibbling' of the seal at high pressures due to radial movement and are easily assembled.

Materials

For hydraulic applications we recommend CLARON P.T.F.E. bearing tape with a **Bronze filling**. Style **BT....**
For pneumatic applications we recommend CLARON P.T.F.E. bearing tape with a **Carbon filling**. Style **CT....**
Other materials are available ant the table in Appendix 2 should be carefully considered.
Consult CLARON for further advice on alternative materials.

Operating Range

Temp. -60°C to 200°C
Velocity 15m/sec
These range parameters are maximum conditional values.
Refer to "Bearing Selection" page E0-1 and "Bearing Materials" in Appendix 1.

How To Order

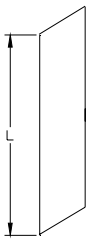
Example:
Hydraulic application, section 2mm, width 9.7mm, Bore 100mm,
Reciprocating application.(R cut): **BT 20097/304/R**

Material **BT** or **CT**
Section & Width S & W
Length L
Type of cut **R** or **O**

TAPE LENGTH 'L'
(For Temperatures upto 120°C)

Piston Application (mm)
$L=\pi(0.99ØD_1-S)-1$

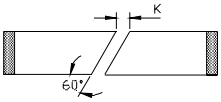
Rod Application (mm)
$L=\pi(0.99Ød_2+S)-1$



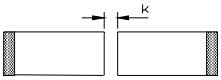
For rolls of tape, quote length required and material / size code. e.g. 15m **BT 25097**

TYPE OF CUT

Reciprocating Application Suffix **R**



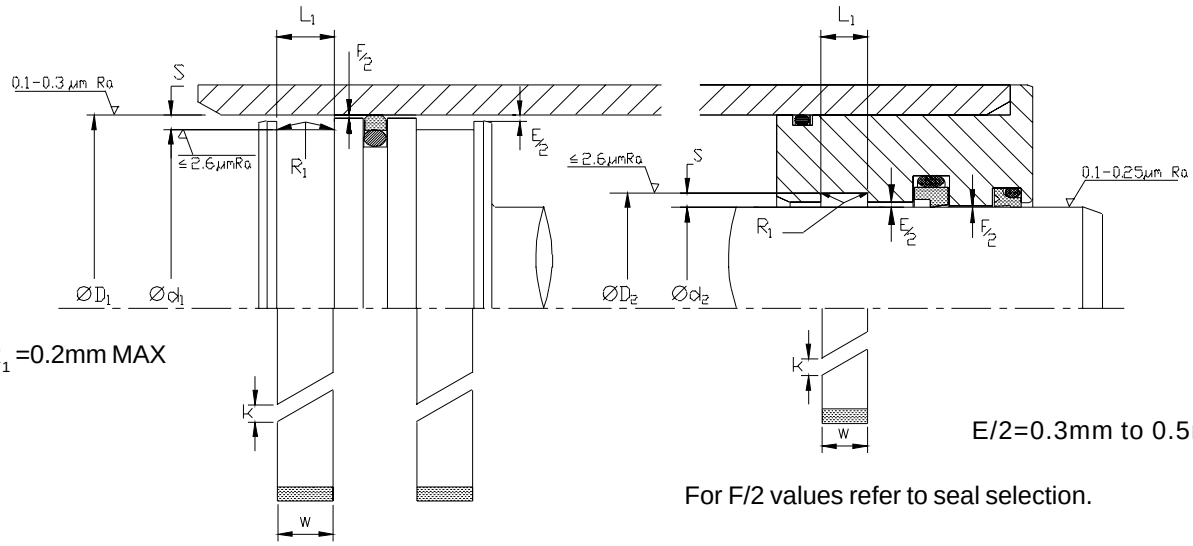
Rotary or **O**scillating Application Suffix **O**



TAPE WIDTH 'W'
In new designs, the choice of tape width 'W' is determined by formula based upon load, diameter and material capability under the given operating conditions.
Note:
Refer also to "Bearing Selection" page E0-1.

Housing

For surface finish and recommended lead in chamfers refer to the illustration below. For housing dimensions and machining tolerances refer to the catalogue page of selected seal. Refer to Appendix 4 for value of tolerance symbols.



R_1 =0.2mm MAX

E/2=0.3mm to 0.5mm

For F/2 values refer to seal selection.

Bearing Material

Claron P.T.F.E. Bearing Tape is specifically designed for use with P.T.F.E. Composite Seals. The nature of P.T.F.E. allows for a manufactured size giving a tighter fit than 'harder' materials such as Phosphor-Bronze, Meehanite or Polyester Fabric. This reduction in radial clearance gives a marginal improvement to the pressure capability of the seal but, more importantly, protects the seal from contaminant particles within the system. A combination of the design of the bearing and the characteristics of P.T.F.E. allow the particles to become embedded in the P.T.F.E. on the non-working face, thus also protecting the steel counterface from scoring. During use, bearing materials wear, causing debris and contamination of the fluid.Extensive tests have shown that particulate contamination >15µm within the fluid, increases with the use of Phosphor-Bronze or Meehanite, and tends to decrease with the use of P.T.F.E. The harder debris created by these bearings also has a greater effect upon seal performance.Particulate contamination in the fluid surrounding the seal can be over 100 times that in the main system due to the bearing preventing flushing of the seal space. Increased contamination in this area will increase the probability of a large enough particle gaining access to the seal interface, causing damage and leakage.**Claron P.T.F.E. Bearing Tape** is designed to allow pressure relief to the seal by use of the expansion gap (**k**). This avoids the possibility of a pressure lock between the seal and the bearing, as well as eliminating the possibility of Hydrodynamic pressure build-up (shown in Figure 1) causing premature destruction of the seal.

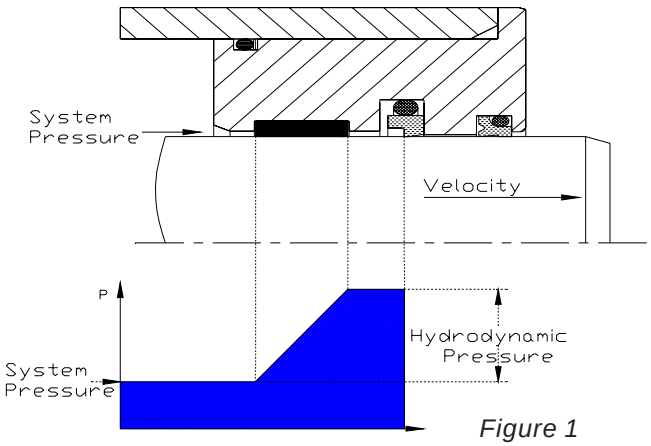


Figure 1

This relief also avoids the presence of excess pressure during the return stroke which can prevent the transfer of the fluid film back to the pressure side of the seal, so creating the effect of a leaking seal. Pressure relief should be incorporated within the design of continuous bearings, particularly for fast cycling applications.The advantages of **Claron P.T.F.E. Bearing Tape** are not restricted to **Composite Seals** but apply to Nitrile and Polyurethane Seals.

Consideration of Radial Load

The maximum radial load applied to the bearings will determine both the width 'W' of the tape and number of bearings to be used. This can be calculated based on the radial force and the maximum permissible load capacity of the material at a given temperature. In the case of either lubricated dynamic, or unlubricated static applications **BRONZE filled P.T.F.E.** tape should be used and the value of 'P' should be taken from graph 1 shown below.

In the case of unlubricated Dynamic applications, friction has a much greater effect on the material which reduces the permissible load capacity of the material as the velocity increases. Therefore to allow for the effect of velocity, the load capacity P taken from graph 1 for **CARBON filled P.T.F.E.** should be reduced by multiplying it by a factor f taken from graph 2.

Lubricated Dynamic Conditions

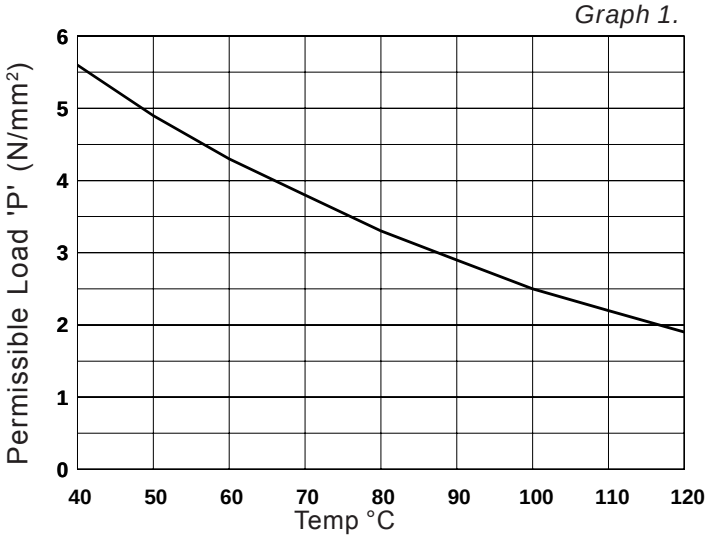
$$W = \frac{F\ max}{P x n x d}$$

Where:-
W=Minimum Required Tape Width (mm)
n=Number of Bearings
F=Maximum Radial Force (Kp)
d=Inside diameter of tape(mm)
P=Permissible load capacity N/mm²)
f=Reduction Factor

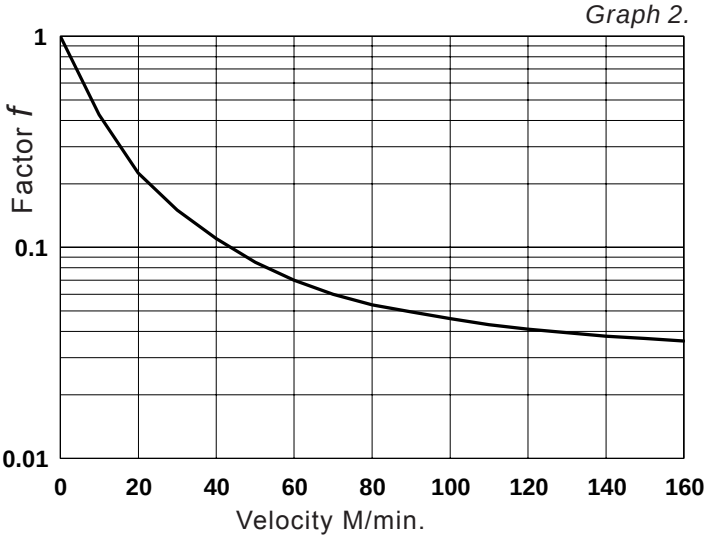
Unlubricated Dynamic Conditions

$$W = \frac{F\ max}{P x f x n x d}$$

Graph 1.



Graph 2.



Nominal Dimensions & Machining Tolerances

Claron Part Number Prefix BT CT	S	W MAX	Min Ø Ød1	Min Ø ØD2	≤100mm +0.00 -0.05 >100mm +0.00 -0.08 $Ød_1$	≤115mm +0.05 -0.00 >115mm +0.08 -0.00 $ØD_2$	+0.20 -0.00 L_1
15032	1.5	3.0	10	10	D_1-3.0	d_2+3.0	3.2
15063	1.5	6.1	15	10	D_1-3.0	d_2+3.0	6.3
15097	1.5	9.5	30	25	D_1-3.0	d_2+3.0	9.7
15150	1.5	14.8	45	35	D_1-3.0	d_2+3.0	15.0
15200	1.5	19.5	50	40	D_1-3.0	d_2+3.0	20.0
15250	1.5	24.5	100	80	D_1-3.0	d_2+3.0	25.0
15300	1.5	29.5	110	110	D_1-3.0	d_2+3.0	30.0
15400	1.5	39.5	110	110	D_1-3.0	d_2+3.0	40.0
20063	2.0	6.1	20	15	D_1-4.0	d_2+4.0	6.3
20081	2.0	7.9	30	25	D_1-4.0	d_2+4.0	8.1
20097	2.0	9.5	35	30	D_1-4.0	d_2+4.0	9.7
20100	2.0	9.8	35	30	D_1-4.0	d_2+4.0	10.0
20150	2.0	14.8	50	40	D_1-4.0	d_2+4.0	15.0
20200	2.0	19.5	75	60	D_1-4.0	d_2+4.0	20.0
20250	2.0	24.5	120	100	D_1-4.0	d_2+4.0	25.0
20300	2.0	29.5	130	130	D_1-4.0	d_2+4.0	30.0
20350	2.0	34.5	150	150	D_1-4.0	d_2+4.0	35.0
25056	2.5	5.4	25	20	D_1-5.0	d_2+5.0	5.6
25063	2.5	6.1	25	20	D_1-5.0	d_2+5.0	6.3
25081	2.5	7.9	35	30	D_1-5.0	d_2+5.0	8.1
25097	2.5	9.5	40	35	D_1-5.0	d_2+5.0	9.7
25100	2.5	9.8	40	35	D_1-5.0	d_2+5.0	10.0
25150	2.5	14.8	60	50	D_1-5.0	d_2+5.0	15.0
25200	2.5	19.5	90	75	D_1-5.0	d_2+5.0	20.0
25250	2.5	24.5	140	120	D_1-5.0	d_2+5.0	25.0
25300	2.5	29.5	150	150	D_1-5.0	d_2+5.0	30.0
30063	3.0	6.1	30	25	D_1-6.0	d_2+6.0	6.3
30081	3.0	7.9	45	40	D_1-6.0	d_2+6.0	8.1
30097	3.0	9.5	45	40	D_1-6.0	d_2+6.0	9.7
30100	3.0	9.8	45	40	D_1-6.0	d_2+6.0	10.0
30127	3.0	12.5	70	60	D_1-6.0	d_2+6.0	12.7
30150	3.0	14.8	70	60	D_1-6.0	d_2+6.0	15.0
30200	3.0	19.5	120	100	D_1-6.0	d_2+6.0	20.0
30250	3.0	24.5	160	140	D_1-6.0	d_2+6.0	25.0
30300	3.0	29.5	170	170	D_1-6.0	d_2+6.0	30.0
32056	3.2	5.4	35	30	D_1-6.4	d_2+6.4	5.6
32127	3.2	12.5	70	60	D_1-6.4	d_2+6.4	12.7
32190	3.2	18.8	120	100	D_1-6.4	d_2+6.4	19.0
32254	3.2	24.9	160	140	D_1-6.4	d_2+6.4	25.4
40063	4.0	6.1	45	35	D_1-8.0	d_2+8.0	6.3
40081	4.0	7.9	50	40	D_1-8.0	d_2+8.0	8.1
40097	4.0	9.5	60	50	D_1-8.0	d_2+8.0	9.7
40150	4.0	14.8	80	70	D_1-8.0	d_2+8.0	15.0
40200	4.0	19.5	130	110	D_1-8.0	d_2+8.0	20.0
40250	4.0	24.5	180	160	D_1-8.0	d_2+8.0	25.0

BGF

Design

Claron BGF bearing rings are designed for use on pistons or rods to align rod and piston and to prevent metal to metal contact. This bearing is precision moulded from a reinforced and heat stabilised grade of Nylon. The reinforcing fibres allows a higher than normal load capability and life span for this type of material. All Claron bearing rings are split to facilitate assembly, and to allow the passing of fluid. See the 'selection of bearing rings' at the beginning of this section for further application details.

Operating Conditions

Max. Operating Temp	110°C
Max. Linear Velocity	1.5 m/sec

See graph at the beginning of this section
for load capacity values

Continuos operating temperature for various fluids

PA Nylon		
DIN	**Hydraulic Fluid Description**	**°C**
H	Mineral oil without additives	120
H-L	Mineral Fluid with anti corrosion and anti ageing additives	120
H-LP	Mineral oil as HL plus additives reducing wear, raising load	120
H-LPD	Mineral oil as H-LP but with detergents and dispersants	120
H-V	Mineral oil as H-LP plus improved viscosity temp.	120
HFA E	Emulsions of mineral oil in water. Water content 80-95%	55
HFA S	Synthetic oil in water. Water content 80-95%	55
HFB	Emulsions of water in mineral oil. Water content 40%	60
HFC	Aqueous polymer solutions. Water content 35%	60
HFD R	Phosphoric acid ester based	80
HFD S	Chlorinated hydrocarbon based	80
HFD T	Mixtures of HFD R and HFD S	80
HEPG	Polyglycol based	100
HETG	Vegetable Oil based	60
HEES	Fully synthetic ester based	100

How To Order

Order using the part number shown followed by
a suffix denoting the type of cut required:-

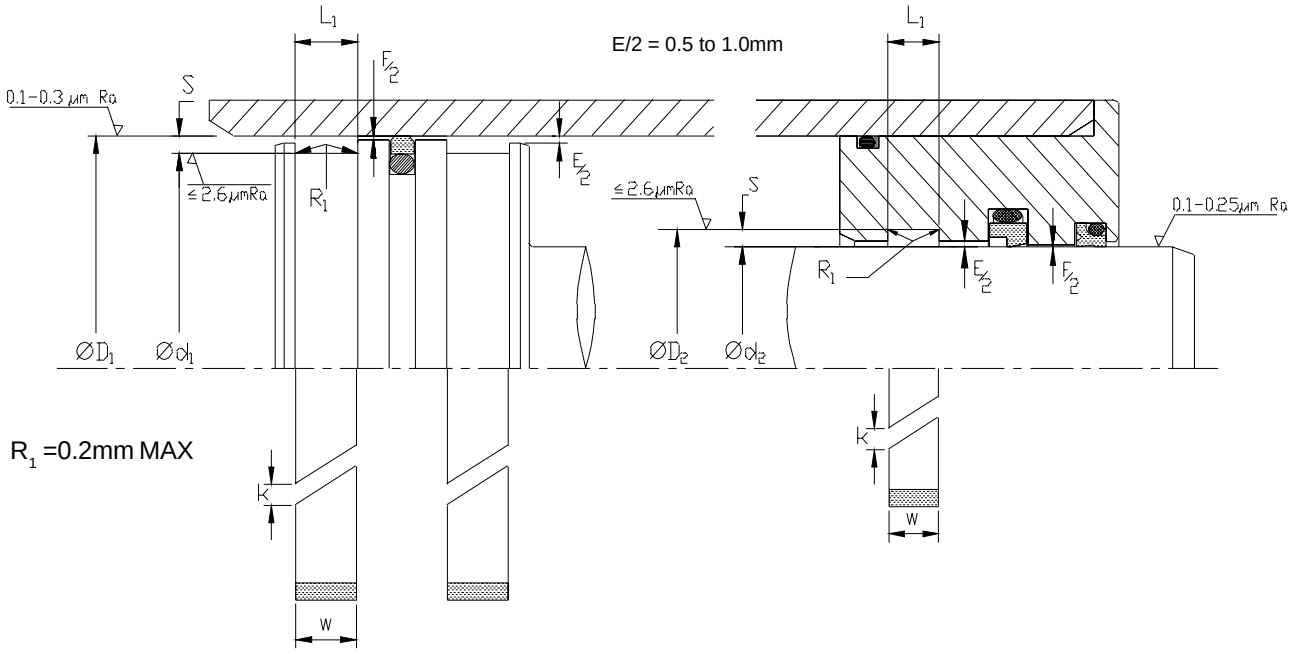
Type	**Suffix**
Straight cut	/O
Angle cut	/R60 (where the number represents the angle required)

Housing

For surface finish and recommended lead in chamfers refer to the illustration below. For housing dimensions and machining tolerances refer to the catalogue page of selected seal.
Refer to Appendix 4 for value of tolerance symbols.

Fitting

For the bearing to function correctly, it is important that care be taken in fitting the bearing within its housing.
For a detailed checklist, refer to Appendix 3.



R_1 =0.2mm MAX

BGF

Metric

Nominal Dimensions & Machining Tolerances

Claron Part Number	H9 ØD$_1$	≤115mm +0.05 -0.00 >115mm +0.08 -0.00 ØD$_2$	≤100mm +0.00 -0.05 >100mm +0.00 -0.08 Ød$_1$	f8 Ød$_2$	+0.20 -0.00 L$_1$	E
BGF 032028960/	32.0		28.0		9.6	
BGF 044040300/	44.0		40.0		30.0	
BGF 050044090/	50.0		44.0		9.0	
BGF 055040010/	55.0		40.0		10.0	
BGF 055049125/	55.0		49.0		12.5	
BGF 062057198/	62.18		57.18		19.8	
BGF 063058055/	63.0		58.0		5.5	
BGF 065050010/	65.0		50.0		10.0	
BGF 065055070/	65.0		55.0		7.0	
BGF 065061080/	65.0		61.0		8.0	
BGF 065061100/	65.0		61.0		10.0	
BGF 068064100/	68.0		64.0		10.0	
BGF 070064125/	70.0		64.0		12.5	
BGF 070065070/	70.0		65.0		7.0	
BGF 070065205/	70.0		65.0		20.5	
BGF 071066055/	71.0		66.0		5.5	
BGF 075060010/	75.0		60.0		10.0	
BGF 075070057/	75.0		70.0		5.7	1.0 to 2.0
BGF 075071100/	75.0		71.0		10.0	
BGF 080074097/	80.0		74.0		9.7	
BGF 080074125/	80.0		74.0		12.5	
BGF 080075097/	80.0		75.0		9.7	
BGF 080076100/	80.0		76.0		10.0	
BGF 083080150/	83.0		80.0		15.0	
BGF 085081100/	85.0		81.0		10.0	
BGF 090084125/	90.0		84.0		12.5	
BGF 090085097/	90.0		85.0		9.7	
BGF 094089198/	93.9		88.9		19.8	
BGF 100094125/	100.0		94.0		12.5	
BGF 100095150/	100.0		95.0		15.0	
BGF 105101150/	105.0		101.0		15.0	
BGF 110104125/	110.0		104.0		12.5	
BGF 110105150/	110.0		105.0		15.0	
BGF 115111150/	115.0		111.0		15.0	
BGF 120114125/	120.0		114.0		12.5	
BGF 120116150/	120.0		116.0		15.0	
BGF 130125150/	130.0		125.0		15.0	

Design

Claron PBR bearing rings are designed for use on pistons or rods to align rod and piston and to prevent metal to metal contact. This bearing is precision machined from a reinforced grade of Phenolic resin. The thermoset properties of this material allows a high load capability even at higher temperatures. All Claron bearing rings are split to facilitate assembly, and to allow the passage of fluid.
See the 'selection of bearing rings' at the beginning of this section for further application details.

Operating Conditions

Max. Operating Temp. (Intermittent)	150°C
Max. Operating Temp. (Continuous)	120°C
Max. Linear Velocity	3m/sec

See graph at the beginning of this section for load capacity values

How To Order

Order using the part number shown followed by a suffix denoting the type of cut required:-

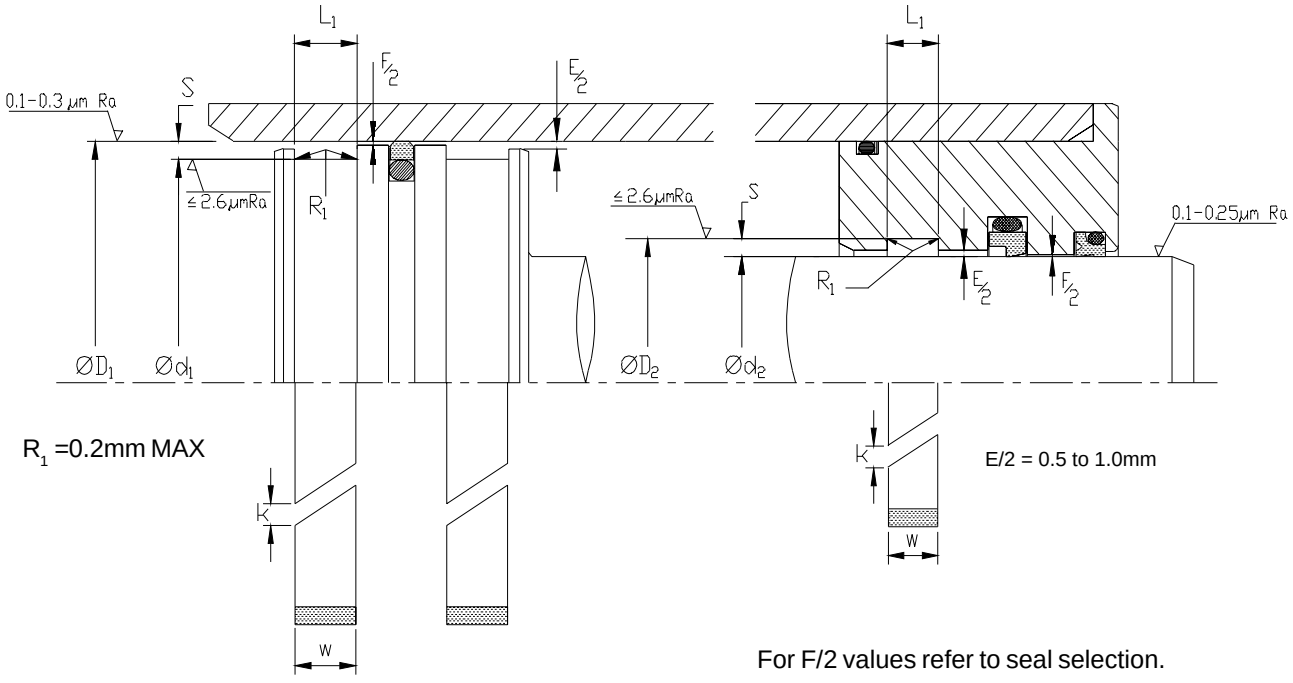
Type	**Suffix**
Straight cut	/O
Angle cut	/R60 (where the number represents the angle required)

Housing

For surface finish and recommended lead in chamfers refer to the illustration below. For housing dimensions and machining tolerances refer to the catalogue page of selected seal.
Refer to Appendix 4 for value of tolerance symbols.

Fitting

For the bearing to function correctly, it is important that care be taken in fitting the bearing within its housing.
For a detailed checklist, refer to Appendix 3.



R_1 =0.2mm MAX

E/2 = 0.5 to 1.0mm

For F/2 values refer to seal selection.

Claron Part Number	Nominal Dimensions & Machining Tolerances						
	H9 ≤115mm +0.05 -0.00 >115mm +0.08 -0.00		f8 ≤100mm +0.00 -0.05 >100mm +0.00 -0.08		+0.20 -0.00	Nom. Sec.	
	$ØD_1$	$ØD_2$	$Ød_1$	$Ød_2$	L_1	S	E
PBR 016011056	**16**		**11.0**		**5.6**	**2.5**	
PBR 020017040	**20**		**16.9**		**4.0**	**1.55**	
PBR 020016080	20		16.0		8.0	2.0	
PBR 020015056	**20**		**15.0**		**5.6**	**2.5**	
PBR 025022040	**25**		**21.9**		**4.0**	**1.55**	
PBR 025021080	25		21.0		8.0	2.0	
PBR 025020056	**25**		**20.0**		**5.6**	**2.5**	
PBR 025020097	25		20.0		9.7	2.5	
PBR 030027040	30		26.9		4.0	1.55	
PBR 030026080	30		26.0		8.0	2.0	
PBR 030025056	30		25.0		5.6	2.5	
PBR 030025097	30		25.0		9.7	2.5	
PBR 032029040	**32**		**28.9**		**4.0**	**1.55**	
PBR 032027056	**32**		**27.0**		**5.6**	**2.5**	
PBR 032027097	32		27.0		9.7	2.5	
PBR 035032040	35		31.9		4.0	1.55	
PBR 035031010	35		31.0		10.0	2.0	
PBR 035030056	35		30.0		5.6	2.5	1.0 to 2.0
PBR 035030097	35		30.0		9.7	2.5	
PBR 040037040	**40**		**36.9**		**4.0**	**1.55**	
PBR 040036010	40		36.0		10.0	2.0	
PBR 040035056	**40**		**35.0**		**5.6**	**2.5**	
PBR 040035097	40		35.0		9.7	2.5	
PBR 045042040	45		41.9		4.0	1.55	
PBR 045040080	45		40.0		8.0	2.5	
PBR 045040056	45		40.0		9.7	2.5	
PBR 045040097	45		40.0		9.7	2.5	
PBR 045040150	45		40.0		15.0	2.5	
PBR 050047040	**50**		**46.9**		**4.0**	**1.55**	
PBR 050045056	**50**		**45.0**		**5.6**	**2.5**	
PBR 050045063	50		45.0		6.3	2.5	
PBR 050045080	50		45.0		8.0	2.5	
PBR 050045097	50		45.0		9.7	2.5	
PBR 050045150	50		45.0		15.0	2.5	
PBR 050044125	50		44.0		12.5	3.0	
PBR 055050056	55		50.0		5.6	2.5	
PBR 055050080	55		50.0		8.0	2.5	
PBR 055050097	55		50.0		9.7	2.5	
PBR 055050150	55		50.0		15.0	2.5	
PBR 060055056	60		55.0		5.6	2.5	
PBR 060055080	60		55.0		8.0	2.5	
PBR 060055097	60		55.0		9.7	2.5	
PBR 060055150	60		55.0		15.0	2.5	
PBR 060054125	60		54.0		12.5	3.0	
PBR 063058056	**63**		**58.0**		**5.6**	**2.5**	

Nominal Dimensions & Machining Tolerances

Claron Part Number	H9 ≤115mm +0.05 -0.00 >115mm +0.08 -0.00 $ØD_1$	$ØD_2$	≤100mm +0.00 -0.05 >100mm +0.00 -0.08 $Ød_1$	f8 $Ød_2$	+0.20 -0.00 L_1	Nom. Sec. S	E
PBR 063058063	63		58.0		6.3	2.5	
PBR 063058097	**63**		**58.0**		**9.7**	**2.5**	
PBR 065060056	65		60.0		5.6	2.5	
PBR 065060097	65		60.0		9.7	2.5	
PBR 065060100	65		60.0		10.0	2.5	
PBR 065060150	65		60.0		15.0	2.5	
PBR 065060200	65		60.0		20.0	2.5	
PBR 068063063	68		63.0		6.3	2.5	
PBR 070065056	70		65.0		5.6	2.5	
PBR 070065097	70		65.0		9.7	2.5	
PBR 070065010	70		65.0		10.0	2.5	
PBR 070065150	70		65.0		15.0	2.5	
PBR 070065200	70		65.0		20.0	2.5	
PBR 070064125	70		64.0		12.5	3.0	
PBR 075070056	75		70.0		5.6	2.5	
PBR 075070063	75		70.0		6.3	2.5	
PBR 075070097	75		70.0		9.7	2.5	
PBR 075070100	75		70.0		10.0	2.5	1.0 to 2.0
PBR 075070150	75		70.0		15.0	2.5	
PBR 080075056	**80**		**75.0**		**5.6**	**2.5**	
PBR 080075097	**80**		**75.0**		**9.7**	**2.5**	
PBR 080075100	80		75.0		10.0	2.5	
PBR 080075100	80		75.0		10.0	2.5	
PBR 080075150	80		75.0		15.0	2.5	
PBR 080075200	80		75.0		20.0	2.5	
PBR 080074125	80		74.0		12.5	3.0	
PBR 085080056	85		80.0		5.6	2.5	
PBR 085080063	85		80.0		6.3	2.5	
PBR 085080097	85		80.0		9.7	2.5	
PBR 085080150	85		80.0		15.0	2.5	
PBR 085079150	85		79.0		15.0	3.0	
PBR 085079250	85		79.0		25.0	3.0	
PBR 090085056	90		85.0		5.6	2.5	
PBR 090085097	90		85.0		9.7	2.5	
PBR 090085150	90		85.0		15.0	2.5	
PBR 090084125	90		84.0		12.5	3.0	
PBR 090084150	90		84.0		15.0	3.0	
PBR 090084250	90		84.0		25.0	3.0	
PBR 095090056	95		90.0		5.6	2.5	
PBR 095090097	95		90.0		9.7	2.5	
PBR 095090150	95		90.0		15.0	2.5	
PBR 095089150	95		89.0		15.0	3.0	
PBR 095089250	95		89.0		25.0	3.0	
PBR 100095056	**100**		**95.0**		**5.6**	**2.5**	
PBR 100095097	**100**		**95.0**		**9.7**	**2.5**	

Claron Part Number	Nominal Dimensions & Machining Tolerances						
	H9 ≤115mm +0.05 -0.00 >115mm +0.08 -0.00		f8 ≤100mm +0.00 -0.05 >100mm +0.00 -0.08		+0.20 -0.00	Nom. sec.	
	$ØD_1$	$ØD_2$	$Ød_1$	$Ød_2$	L_1	S	E
PBR 100095150		100	95.0		15.0	2.5	
PBR 100094125		100	94.0		12.5	3.0	
PBR 100094150		100	94.0		15.0	3.0	
PBR 100094250		100	94.0		25.0	3.0	
PBR 105100056		105	100.0		5.6	2.5	
PBR 105100097		105	100.0		9.7	2.5	
PBR 105100150		105	100.0		15.0	2.5	
PBR 105099250		105	99.0		25.0	3.0	
PBR 110105056		110	105.0		5.6	2.5	
PBR 110105097		110	105.0		9.7	2.5	
PBR 110105150		110	105.0		15.0	2.5	
PBR 110104125		110	104.0		12.5	3.0	
PBR 110104150		110	104.0		15.0	3.0	
PBR 110104250		110	104.0		25.0	3.0	
PBR 115110056		115	110.0		5.6	2.5	
PBR 115110097		115	110.0		9.7	2.5	
PBR 115110150		115	110.0		15.0	2.5	
PBR 115109300		115	109.0		30.0	3.0	1.0 to 2.0
PBR 115109300		115	109.0		30.0	3.0	
PBR 12015056		120	115.0		5.6	2.5	
PBR 120115097		120	115.0		9.7	2.5	
PBR 12015150		120	115.0		15.0	2.5	
PBR 120114125		120	114.0		12.5	3.0	
PBR 120114150		120	114.0		15.0	3.0	
PBR 120114300		120	114.0		30.0	3.0	
PBR 125120056		**125**	**120.0**		**5.6**	**2.5**	
PBR 125120097		**125**	**120.0**		**9.7**	**2.5**	
PBR 125120150		125	120.0		15.0	2.5	
PBR 125119150		125	119.0		15.0	3.0	
PBR 125119300		125	119.0		30.0	3.0	
PBR 130125097		130	125.0		9.7	2.5	
PBR 130125150		130	125.0		15.0	2.5	
PBR 130124125		130	124.0		12.5	3.0	
PBR 130123150		130	123.0		15.0	3.5	
PBR 130123300		130	123.0		30.0	3.5	
PBR 135130097		135	130.0		9.7	2.5	
PBR 135130150		135	130.0		15.0	2.5	
PBR 140135097		**140**	**135.0**		**9.7**	**2.5**	
PBR 140135150		**140**	**135.0**		**15.0**	**2.5**	
PBR 140133200		140	133.0		20.0	3.5	
PBR 140133350		140	133.0		35.0	3.5	
PBR 150145097		150	145.0		9.7	2.5	
PBR 150145150		150	145.0		15.0	2.5	
PBR 150143200		150	143.0		20.0	3.5	
PBR 150143350		150	143.0		35.0	3.5	

Nominal Dimensions & Machining Tolerances

Claron Part Number	H9 ≤115mm +0.05 -0.00 >115mm +0.08 -0.00 $ØD_1$ $ØD_2$	≤100mm +0.00 -0.05 >100mm +0.00 -0.08 f8 $Ød_1$ $Ød_2$	+0.20 -0.00 L_1	Nom. Sec. S	E
PBR 160155097	**160**	**155**	**9.7**	**2.5**	
PBR 160155150	**160**	**155**	**15.0**	**2.5**	
PBR 160153200	160	153	20.0	3.5	
PBR 160153400	160	153	40.0	3.5	
PBR 170165097	170	165	9.7	2.5	
PBR 170165150	170	165	15.0	2.5	
PBR 170162250	170	162	25.0	4.0	
PBR 170162450	170	162	45.0	4.0	
PBR 180175097	**180**	**175**	**9.7**	**2.5**	
PBR 180175150	**180**	**175**	**15.0**	**2.5**	
PBR 180172250	180	172	25.0	4.0	
PBR 180172450	180	172	45.0	4.0	
PBR 190185097	190	185	9.7	2.5	
PBR 190185150	190	185	15.0	2.5	
PBR 190182250	190	182	25.0	4.0	
PBR 190182450	190	182	45.0	4.0	
PBR 200195097	**200**	**195**	**9.7**	**2.5**	
PBR 200195150	**200**	**195**	**15.0**	**2.5**	
PBR 200192250	200	192	25.0	4.0	
PBR 200192450	200	192	45.0	4.0	
PBR 210205097	210	205	9.7	2.5	
PBR 210205150	210	205	15.0	2.5	
PBR 210202250	210	202	25.0	4.0	1.0 to 2.0
PBR 210202500	210	202	50.0	4.0	
PBR 220215097	**220**	**215**	**9.7**	**2.5**	
PBR 220215150	220	215	15.0	**2.5**	
PBR 220212500	220	212	50.0	4.0	
PBR 225217250	225	217	25.0	4.0	
PBR 230225097	230	225	9.7	2.5	
PBR 230225150	230	225	15.0	2.5	
PBR 230225097	230	222	30.0	4.0	
PBR 230222550	230	222	55.0	4.0	
PBR 240235097	240	235	9.7	2.5	
PBR 240235150	240	235	15.0	2.5	
PBR 240232300	240	232	30.0	4.0	
PBR 240232550	240	232	55.0	4.0	
PBR 250245097	**250**	**245**	**9.7**	**2.5**	
PBR 250245150	**250**	**245**	**15.0**	**2.5**	
PBR 250242300	250	242	30.0	4.0	
PBR 250242550	250	242	55.0	4.0	
PBR 260255097	260	255	9.7	2.5	
PBR 260255150	260	255	15.0	2.5	
PBR 260252600	260	252	60.0	4.0	
PBR 270265097	270	265	9.7	2.5	
PBR 270265150	270	265	15.0	2.5	

Piston & Rod Bearing Rings
PBR
Metric

Claron Part Number	Nominal Dimensions & Machining Tolerances						
	H9 ≤115mm +0.05 -0.00 >115mm +0.08 -0.00		f8 ≤100mm +0.00 -0.05 >100mm +0.00 -0.08		+0.20 -0.00	Nom. Sec.	
	$ØD_1$	$ØD_2$	$Ød_1$	$Ød_2$	L_1	S	E
PBR 270262600	270		262		60.0	4.0	1.0 to 2.0
PBR 280275150	**280**		**275**		**15.0**	**2.5**	
PBR 280275250	**280**		**275**		**25.0**	**2.5**	
PBR 280272250	**280**		**272**		**25.0**	**4.0**	
PBR 320315150	**320**		**315**		**15.0**	**2.5**	
PBR 320315250	**320**		**315**		**25.0**	**2.5**	
PBR 320312250	**320**		**312**		**25.0**	**4.0**	
PBR 360355150	**360**		**355**		**15.0**	**2.5**	
PBR 360352250	**360**		**352**		**25.0**	**4.0**	
PBR 400395150	**400**		**395**		**15.0**	**2.5**	
PBR 400395250	**400**		**395**		**25.0**	**2.5**	
PBR 400392250	**400**		**392**		**25.0**	**4.0**	
PBR 450445150	**450**		**445**		**15.0**	**2.5**	
PBR 450445250	**450**		**445**		**25.0**	**2.5**	
PBR 450442250	**450**		**442**		**25.0**	**4.0**	
PBR 500495150	**500**		**495**		**15.0**	**2.5**	
PBR 500495250	**500**		**495**		**25.0**	**2.5**	
PBR 500492250	**500**		**492**		**25.0**	**4.0**	