• Description of parts and functions:

GMT bushes are structural elements, in which an outer and an inner precision sleeve are firmly held together with a layer of vulcanized elastomer. As a standard, a natural rubber is used as a damping material. Alternatively, however, other elastomers in different shore hardnesses can also be used.

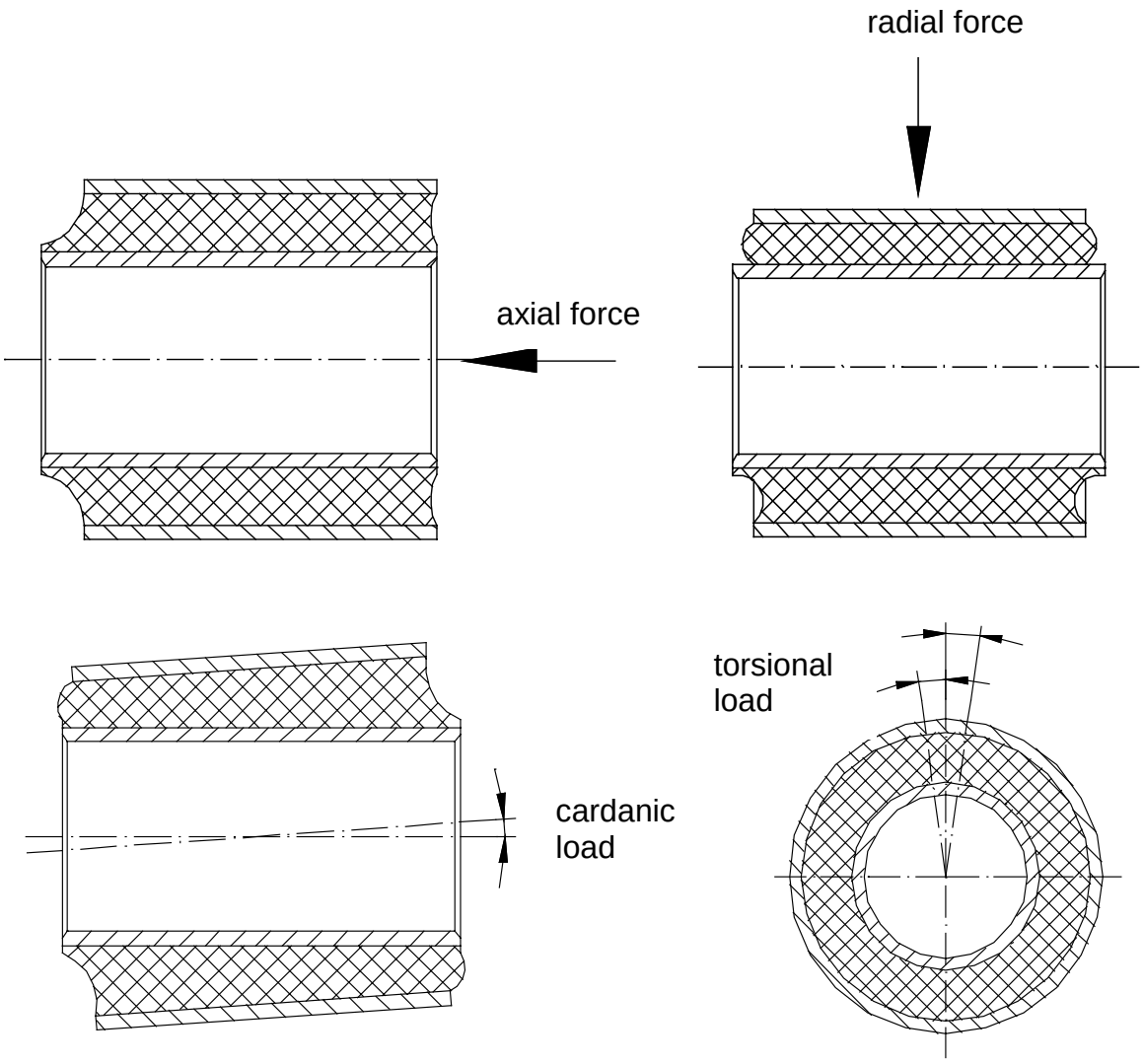
The cylindrical liners dampen axial as well as radial movements and are able to absorb torsional movements as well as cardanic deflections.

Beside the most important dimensions, the general tables also include the maximum values for the static load. For a dynamic application, the values must be reduced to approx. 50%. For cardanic applications, it must be noted that the elastomer layer between the liners may be pressed together by 1/6 of the rubber's thickness.

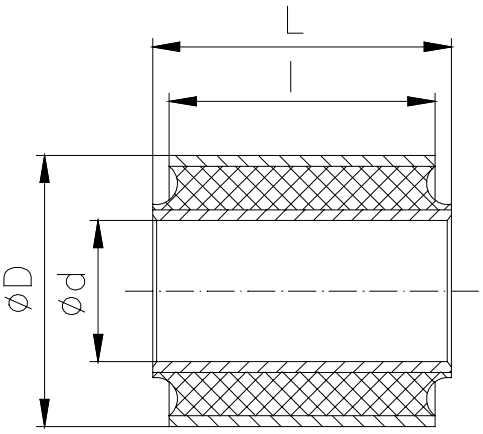
The application temperatures for natural rubber are between – 30°C and + 70°C (for brief exposure up to + 90°C).

During installation, it must be ensured that the joining forces are not conducted through the elastomer. To ensure a flawless installation, the drill holes should show a burr-free chamfer of approx. 15°.

• Dimensions:



Type 410

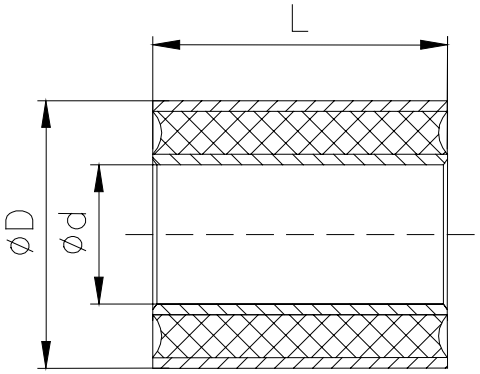


According to the standard we use the following tolerances: D u10, d h9, L +/-0,3, l +/-0,5.
If you need other tolerances please don't hesitate to ask for.

Item Number	D (mm)	d (mm)	L (mm)	l (mm)	Shore-hardness	Radial F max. (N)	Radial s max. (mm)	Axial F max. (N)	Axial s max. (mm)	Torsional max: Moment (Nm)	Torsional max: Angle (°)
410001	22	10	16	15	60	1580	0,2	300	0,7	4,2	8,8
410027	22	12	28	24	60	3445	0,2	510	0,6	7,6	7,8
410058	24	10	23,5	20,5	60	1830	0,4	380	1,1	4,9	12,8
410108	24	10	33	22	60	2000	0,4	327	1,0	4,8	12,0
410002	25	12	28	24	60	3340	0,3	540	0,8	8,7	8,7
410051	25	13	25	16	60	2130	0,3	410	0,8	7,3	8,0
410061	25,4	8	12	9	60	300	0,6	140	1,4	1,5	15,5
410004	28	12	46	40	60	5450	0,4	910	1,3	14,5	12,2
410028	30	12	40	36	60	4350	0,6	810	1,5	13	13,4
410029	32	12	59	55	60	7000	0,6	1250	1,9	19,5	12,0
410063	32	16	21	19	60	2560	0,4	540	1,2	10,7	10,1
410006	40	22	45	40	60	9900	0,4	1580	1,3	44,3	8,2
410080	41,3	12	64	51	60	9340	0,6	1510	1,6	31,8	11,8
410085	44	16	57	54	60	30900	0,3	2670	0,8	93,5	4,8
410030	45	20	70	64	60	13100	0,8	2260	2,2	57	13,0
410150	48	24	93	85	60	19500	0,7	3000	1,9	101	11,0
410045	50	24	99	86	60	23350	0,9	3630	2,4	109	12,3
410093	50	25	85	80	60	17900	0,8	2800	2,1	95,4	12,0
410076	55	30	94	89,5	60	30500	0,8	4420	2,3	155	10,6
410148	55	32	68	60	60	18000	0,5	2700	1,48	124	7,5
410056	57	28,6	88,9	85,7	60	28450	0,8	4300	2,3	153	10,7
410039	58,8	24,1	107	100	60	51100	0,5	6100	1,7	261	7,5
410009	60	35	40	36	60	12400	0,5	2290	1,6	103	6,8
410038	63	38	76	70	60	30400	0,6	4550	1,9	209,4	7,7
410011	63	39	57	50	60	20450	0,5	3350	1,7	155,6	6,9
410084	65	30	122	117	60	47050	0,9	6620	2,8	265	11,0
410089	65	30,3	102	97	60	35650	0,9	5490	2,8	219,4	11,0
410091	65	35	110	100	60	39100	0,9	5940	2,8	249,4	10,7
410141	75	40	88	80	60	30000	1,0	4580	2,8	250	10,5
410033	75	45	100	90	60	41650	0,9	6600	2,8	340	9,3
410147	76	44	79	70	60	23400	1,0	5340	3,7	254	11,0
410048	76	44	133	127	60	8140	0,9	9340	2,8	485,5	9,3
410013	76,2	44,5	79,6	76,4	60	30910	0,9	5720	2,9	303	9,5
410014	78	50	66	60	60	31340	0,6	5090	2,0	305	6,3
410049	78,6	44,5	134	129,7	60	95450	0,6	11000	2,1	660	6,7
410016	118	60	135	125	60	99350	1,1	15400	3,7	1338	7,8
410083	125	70	74	65	60	36900	1,4	7610	4,4	663,9	9,0
410017	125	70	120	111	60	76050	1,4	13340	4,4	1134	9,0
410072	125	70	160	151	60	111090	1,4	18145	4,4	1540	9,0
410077	126	70	100	92	60	49750	1,9	10410	5,6	832	11,2
410018	127	44,5	105	102	60	36300	3,0	8650	7,5	519	15,5
410074	140	80	182	170	60	167200	1,1	26900	3,5	3000	6,1
410019	140	100	120	110	60	103550	1,1	17100	3,8	1881	6,5
410052	145	100	100	89,4	60	81650	1,1	1447	3,6	1664	6,1
410020	160	100	180	172	60	190100	1,5	29200	5,0	3502	7,6

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

Type 420



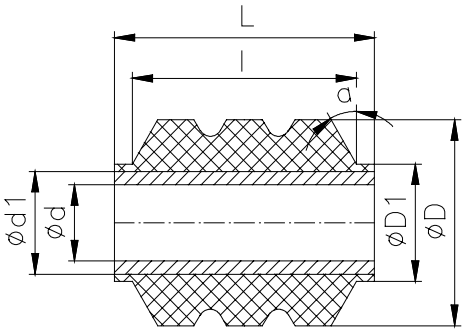
According to the standard we use the following tolerances: D u10, d h9, L +/-0,3, l +/-0,5.
If you need other tolerances please don't hesitate to ask for.

Item number	D [mm]	d [mm]	L [mm]	Shore-hardness	Axial		Radial		Torsional max:	
					F max. [N]	s max. [mm]	F max. [N]	s max. [mm]	Moment [Nm]	Angle [°]
420029	32	18	20	60	622	1.0	2610	0.3	13.7	7.9
420001	40	22	40	60	1580	1.3	9890	0.4	44.3	8.2
420015	45	20	24	60	850	2.2	1910	0.8	21.2	13.0
420033	45	20	30	60	1060	2.2	4650	0.8	26.5	13.0
420003	48	24	80	60	3170	2.3	20290	0.8	88.7	12.3
420031	55	30	66	60	3360	2.1	20650	0.7	120.9	10.0
420019	65	40	15	60	950	2.3	2000	0.8	42.9	9.1
420032	68	36	67	60	4830	1.5	35550	0.4	246.4	5.7
420035	77	40	65	60	5330	1.5	38500	0.4	309	5.2
420018	82	48	82	60	7540	1.8	2320	0.6	490	5.6
420010	109	48.8	82	60	10200	1.9	96000	0.6	900	4.3
420009	109	48.8	104	60	12940	1.9	153600	0.6	1140	4.3
420014	127.4	78	90	60	13490	1.9	138000	0.6	1430	3.7
420016	130	54	117	60	18195	1.9	240600	0.6	2000	3.6
420007	130	78	117	60	18195	1.9	240600	0.6	2000	3.6
420006	158.8	95.1	12.7	60	1080	6.3	1105	2.1	118	9.8
420017	291.5	150	75	60	24390	7.0	54390	2.1	5610	5.9

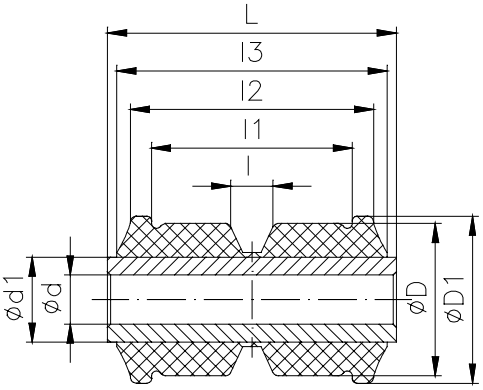
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

Special designs

Item Number	D (mm)	L (mm)	D1 (mm)	l (mm)	d (mm)	d1 (mm)	a (°)
474002	58,2	80	32	72	25	30	30,0
474001	28,1	36	16	31	10,4	14	30,0
479004	40	60	22	56	16,4	20	30,0
479003	27,5	36	16	32	10,4	14	25,0



Item Number	D (mm)	D1 (mm)	d (mm)	d1 (mm)	L (mm)	l (mm)	l1 (mm)	l2 (mm)	l3 (mm)
476001	50,2	55	16,2	28	95	15	66	80	89
476002	58	68	36	42	96	19	64	80	76
473001	32,6	36	12	20	52	-	21	-	47



Item Number	D (mm)	D1 (mm)	d (mm)	d1 (mm)	L (mm)	l (mm)	l1 (mm)	l2 (mm)	a (°)	Figure
472001	43	-	14,1	20,1	65	65	40	-	-	1
472002	60	-	30	35,2	68	60	-	-	35	1
472003	100	-	50	-	130	-	50	-	-	1
472006	20	-	7,5	10	16	14	-	-	30	1
472010	66	-	30	48	100	87	64	-	-	1
472004	66	72	17	40	70	60	34	10	-	2

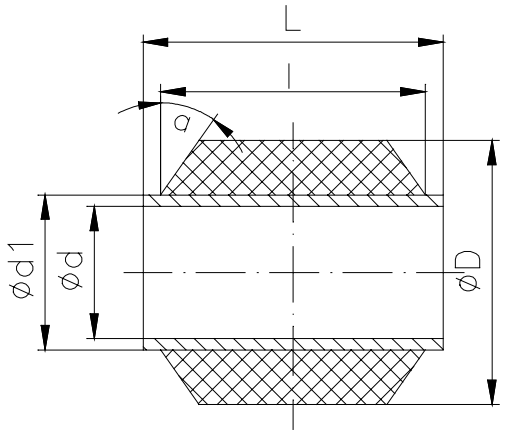


Figure 1

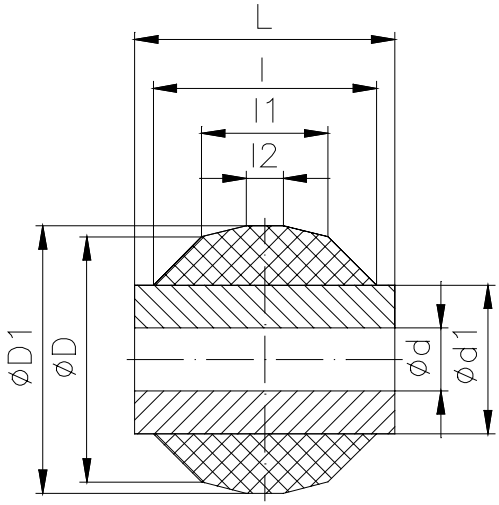


Figure 2

• Description of parts and functions:

GMT ball joints are structural elements whose inner ball is firmly connected to the outer metal by means of a vulcanized elastomer layer. Such joints are designed for multi-directional torsional loads and, thus, ideal as vibration-technological components for joints and connecting rods. One advantage is the fact that all movements can be achieved without any lubricants. GMT ball joints can be made up of an inner pin / through hole as well as of an outer socket consisting of one or several segments.

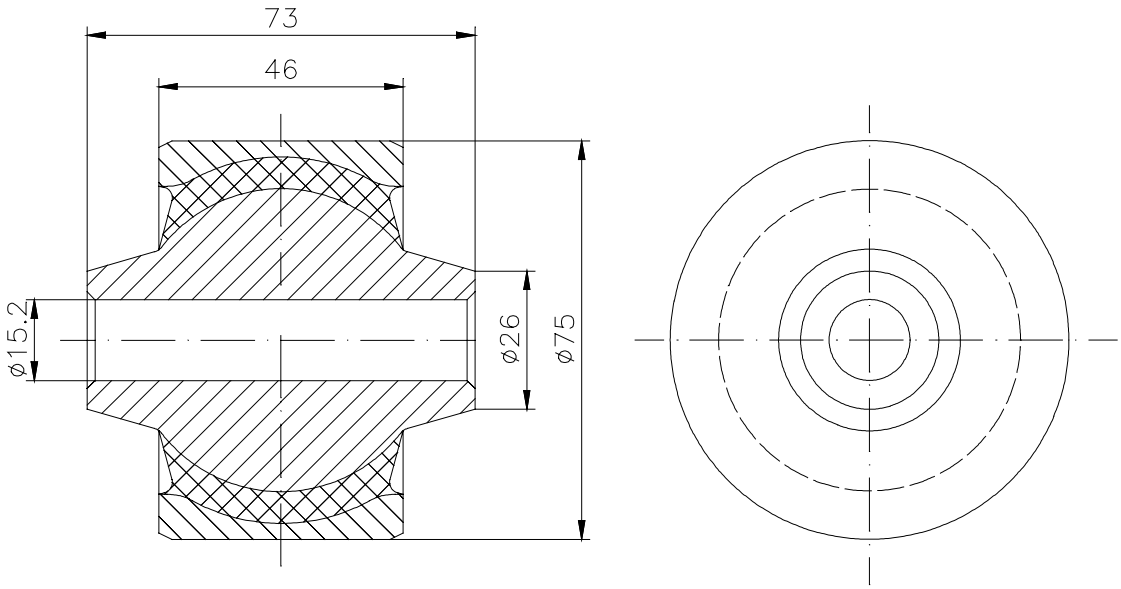
• Spring parameters:

Item number	approx. hardness value [Sh-A]	C_{ax} [kN/mm]	$S_{ax\ max}$ [mm]	C_{rad} [kN/mm]	$S_{rad\ max}$ [mm]	C_{tors} [Nm/°]	$\sphericalangle_{tors\ max}$ [°]	C_{card} [Nm/°]	$\sphericalangle_{card\ max}$ [°]
641 005	70	1,5	2,4	8,1	0,9	20	3,4	11	1,4
641 019	70	1,8	2,4	10,4	0,9	22	3,4	12	1,4
642 010	45	0,9	1,6	6,2	0,6	7	2,7	4	1,1
642 002	65	2,3	1,6	15,9	0,6	18	2,7	10	1,1
641 012	75	1,7	3,4	7,9	1,3	49	3,5	25	1,4
641 017	65	0,8	2,8	3,6	1,1	6	4,4	3	1,8
641 006	75	3,8	2,4	24,1	0,9	59	3,0	32	1,2
643 020	75	3,9	1,8	29,5	0,7	54	2,5	29	1,0
643 029	60	2,1	2,0	15,7	0,8	36	2,5	19	1,0
641 009	60	1,3	3,0	7,2	1,1	30	3,2	16	1,3
643 004	60	1,5	3,0	8,8	1,1	27	3,4	15	1,4
642 005	60	2,3	2,4	15,4	0,9	32	2,9	18	1,2
641 025	50	1,9	2,4	12,5	0,9	24	2,9	14	1,2
642 009	60	2,9	2,4	19,2	0,9	35	2,9	20	1,2
641 023	55	2,2	2,4	14,3	0,9	27	2,9	15	1,2
643 001	70	3,5	2,4	23,2	0,9	48	2,9	27	1,2
641 029	70	2,0	5,4	8,8	2,0	113	3,7	60	1,5
646 001	60	2,5	2,8	16,8	1,1	53	2,9	29	1,2
641 002	60	2,0	3,4	12,0	1,3	51	9,0	28	4,0
643 005	65	11,6	2,4	97,0	0,9	706	2,1	394	0,8
642 004	60	1,1	6,4	4,6	2,4	37	4,7	20	1,9
641 030	65	4,4	4,2	30,2	1,6	280	2,7	151	1,1
644 002	75	6,2	4,2	38,7	1,6	213	3,2	120	1,3

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Dimensions:**

641005



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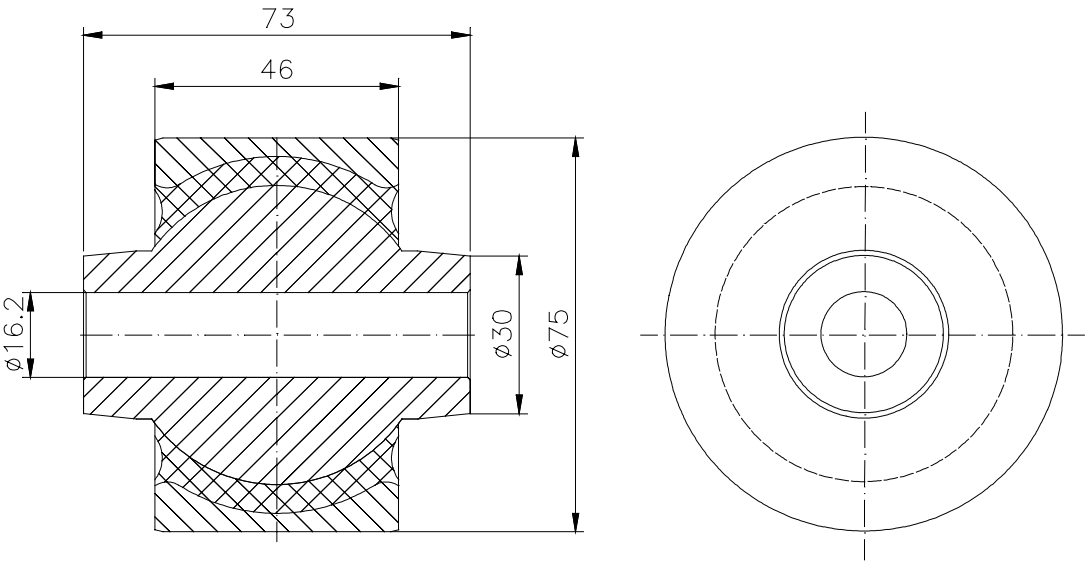

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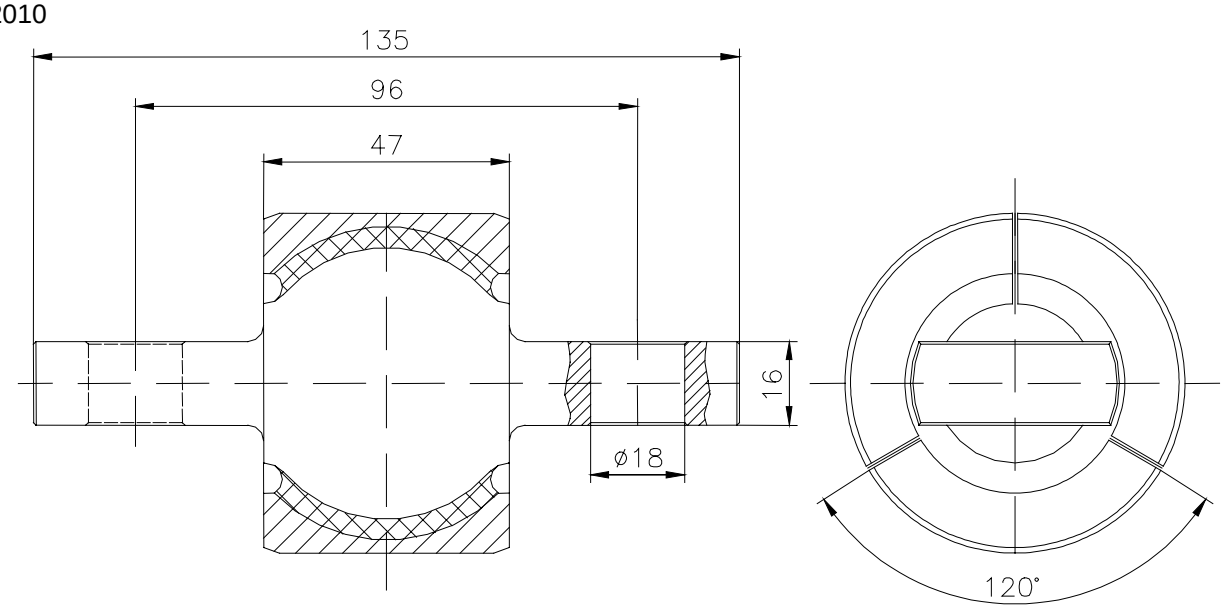

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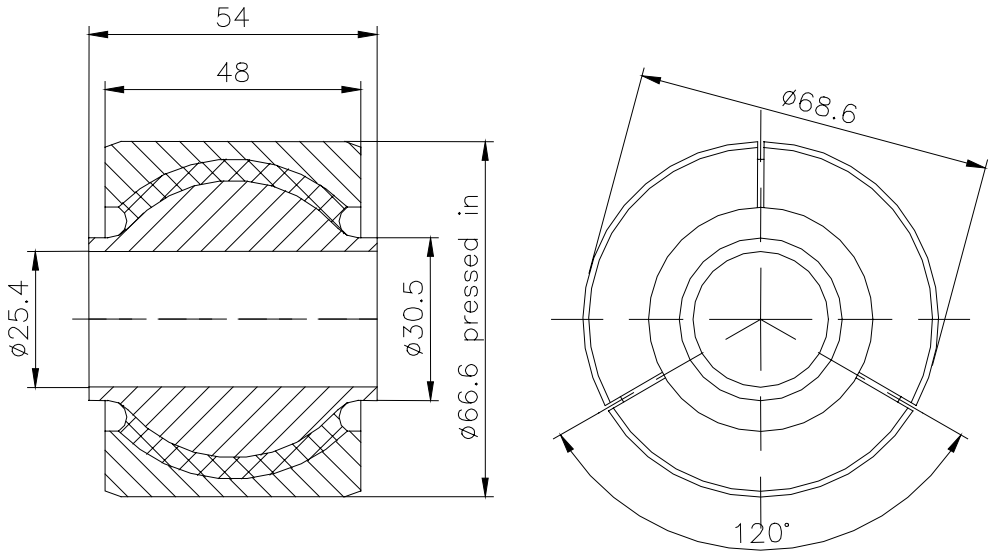

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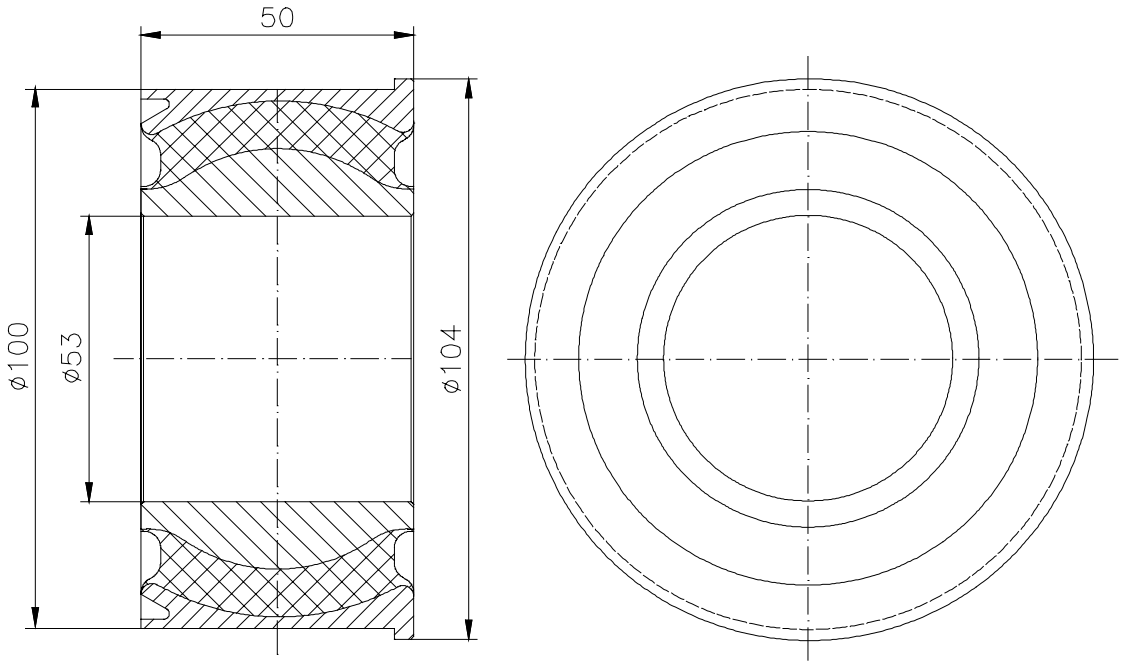

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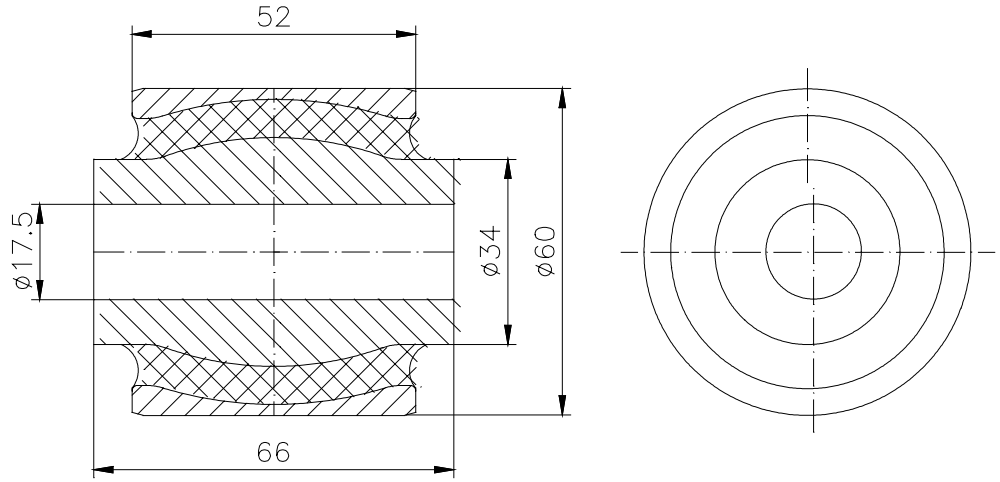

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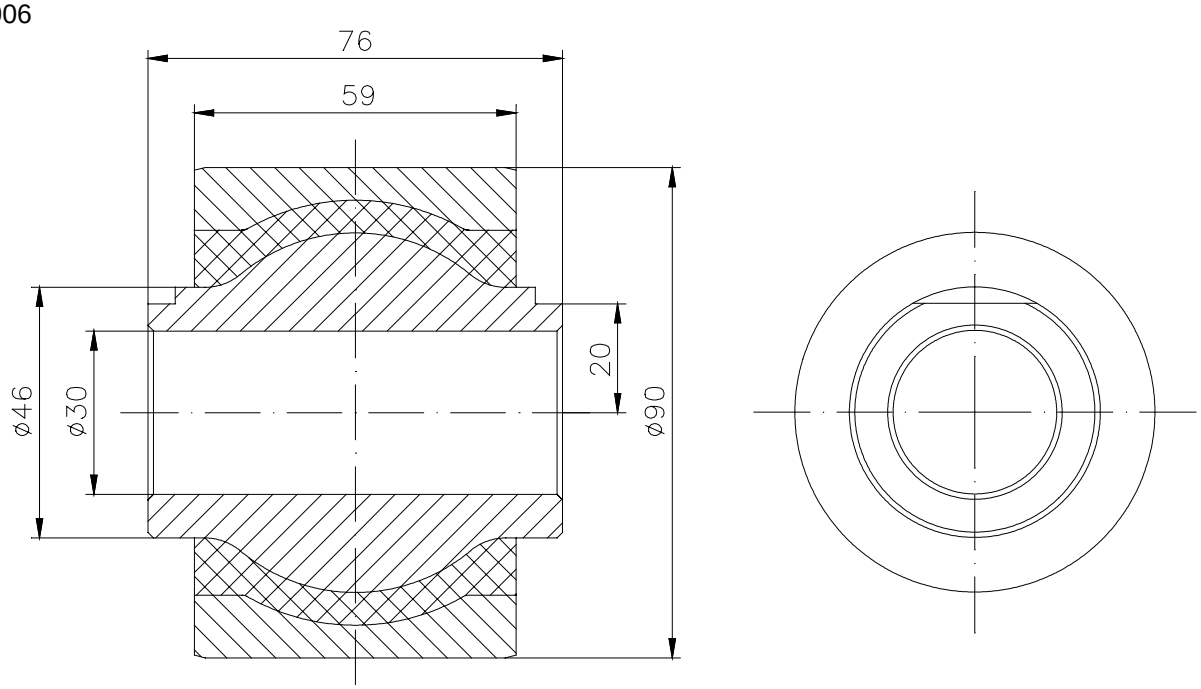

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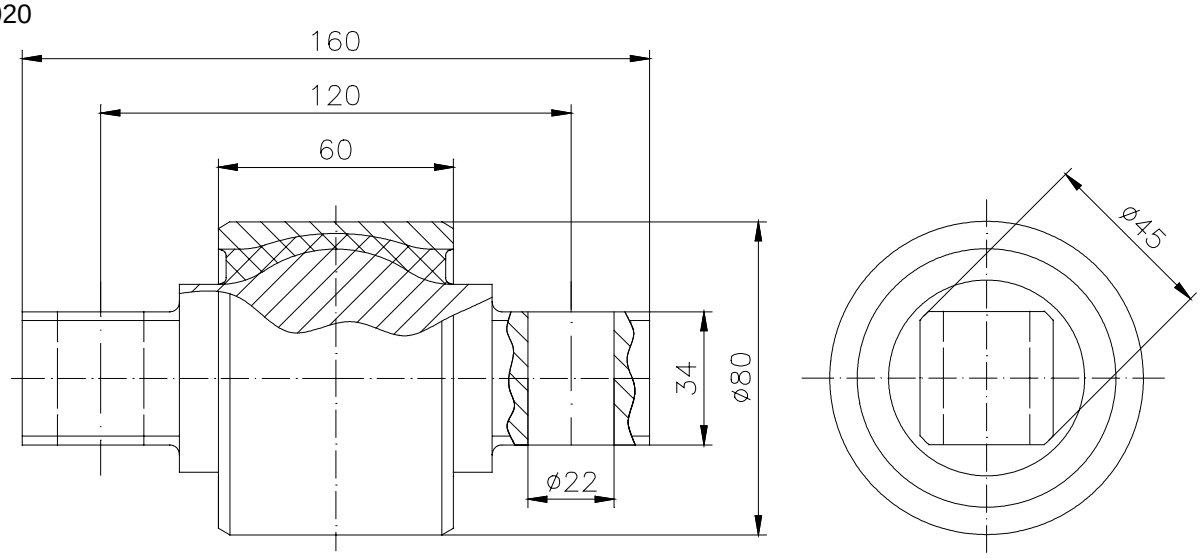

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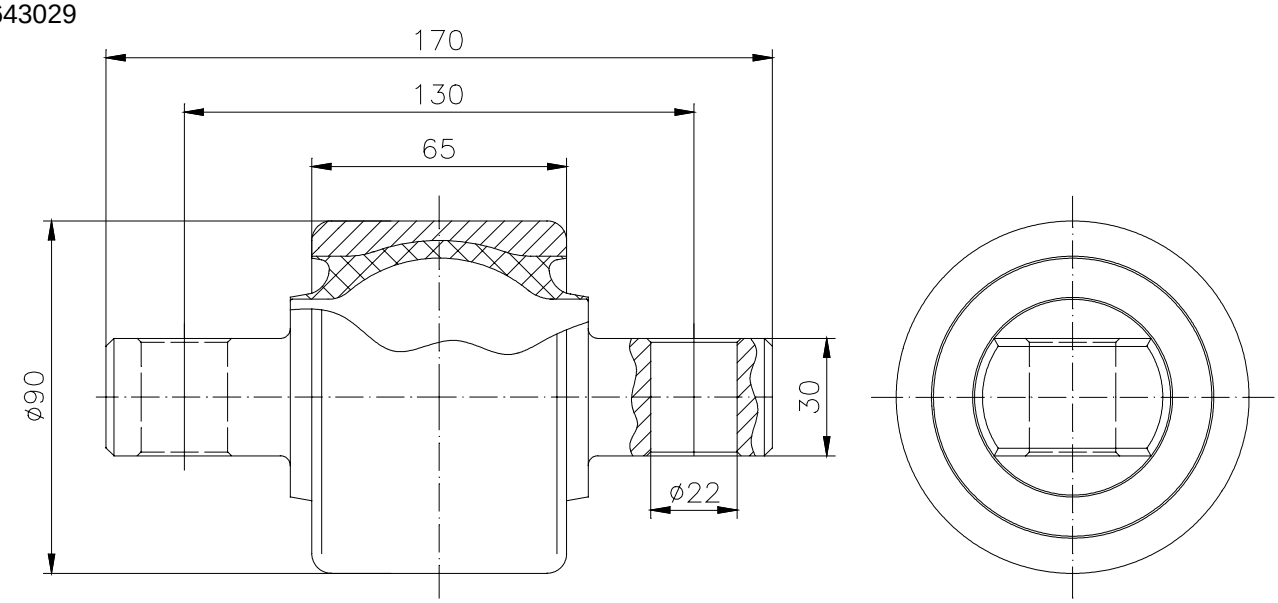

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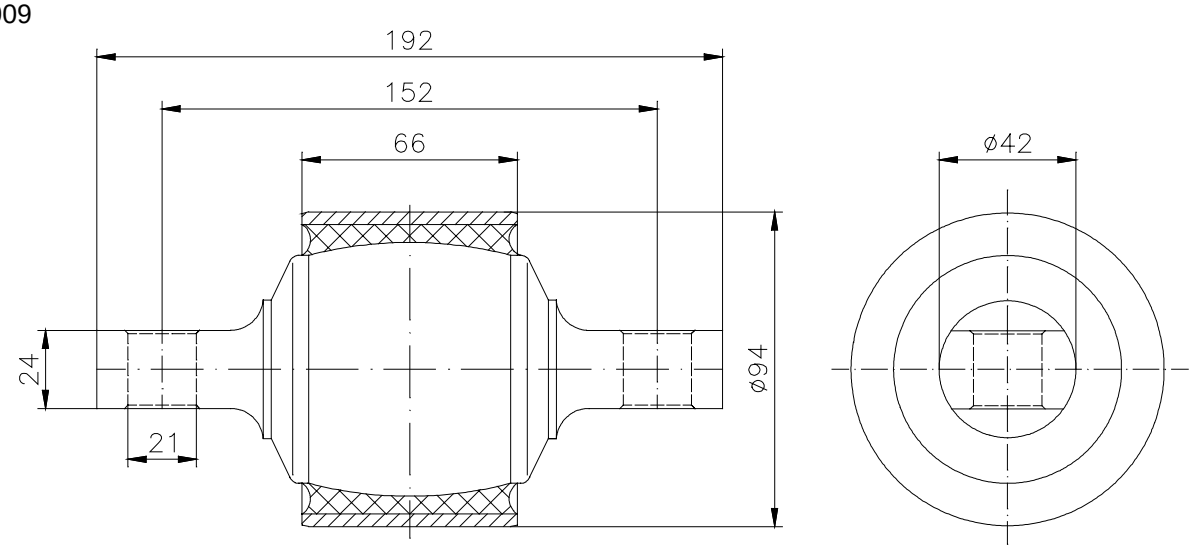

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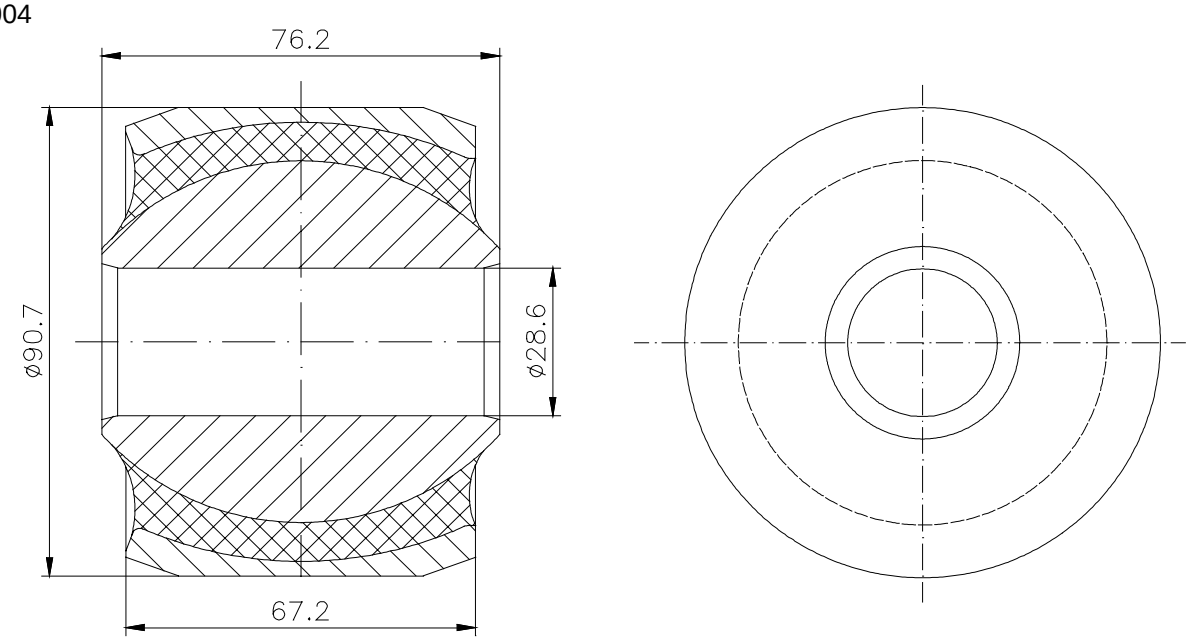

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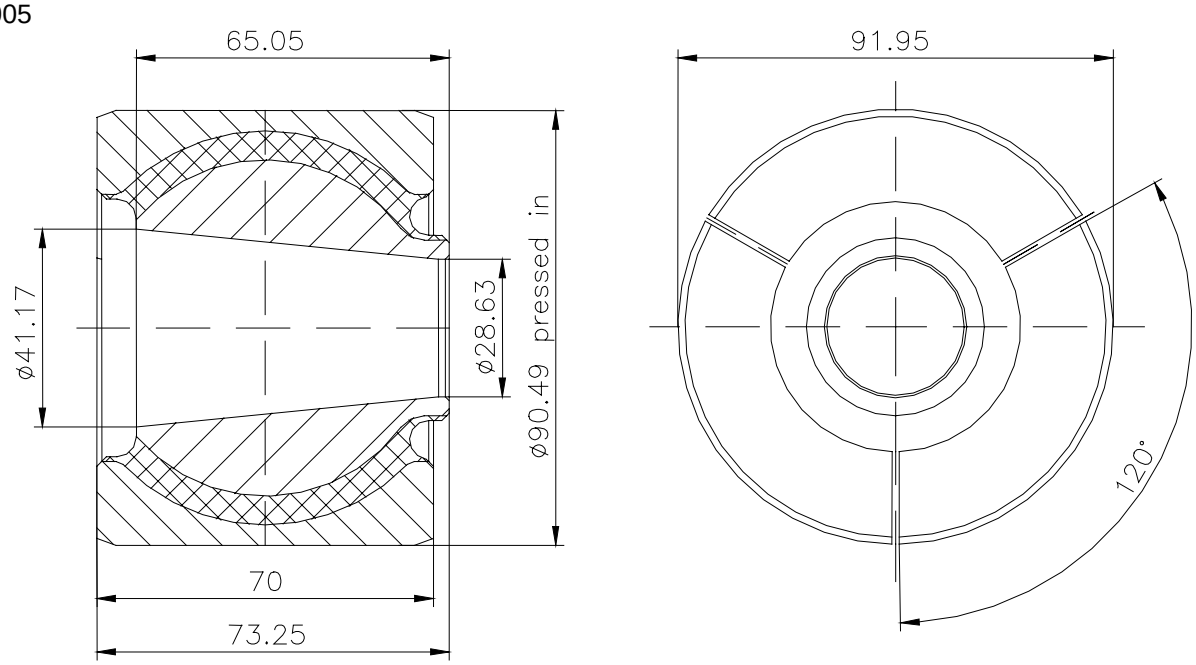

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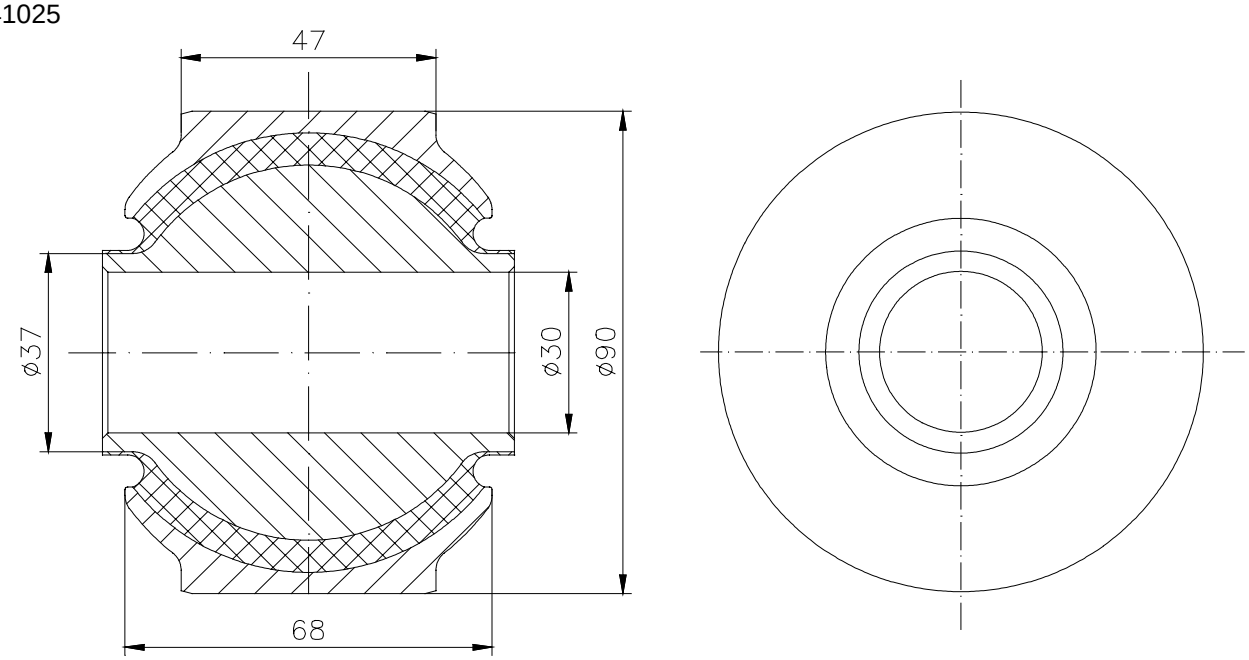

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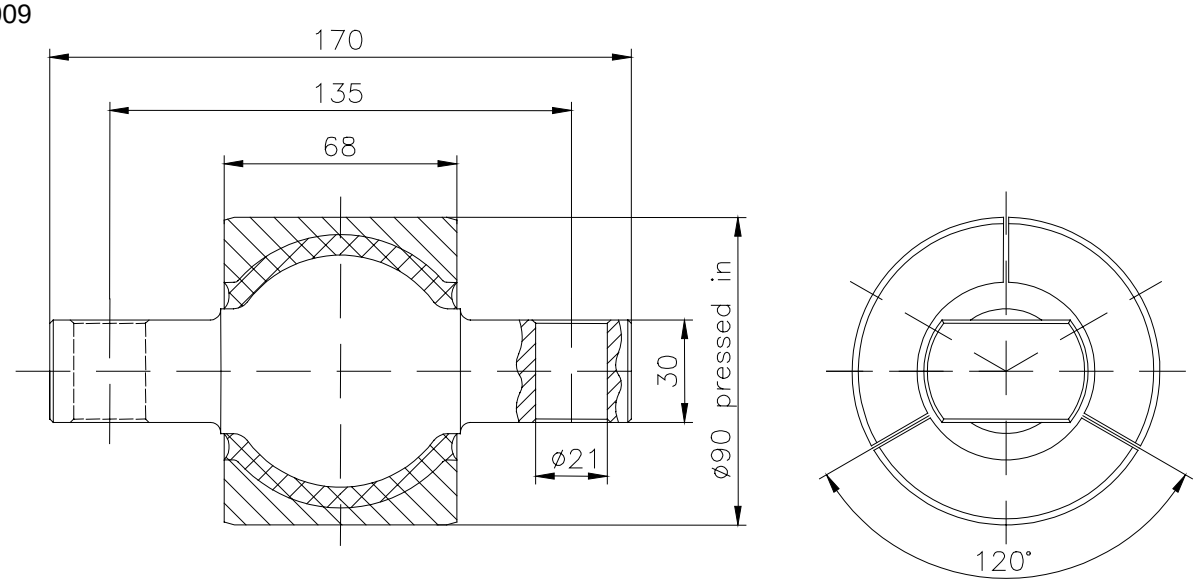

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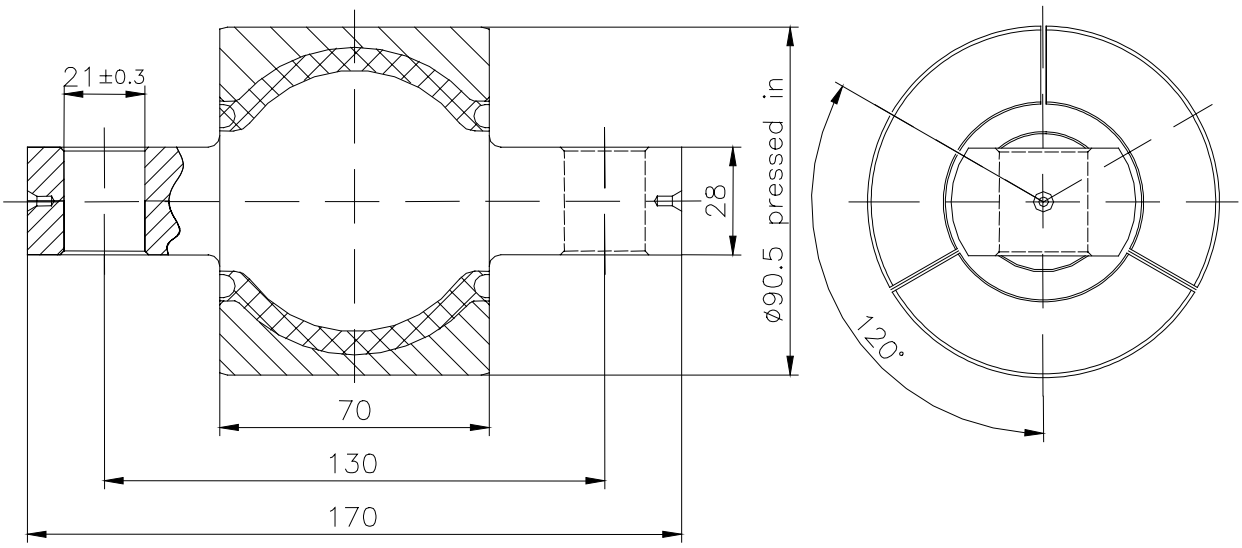

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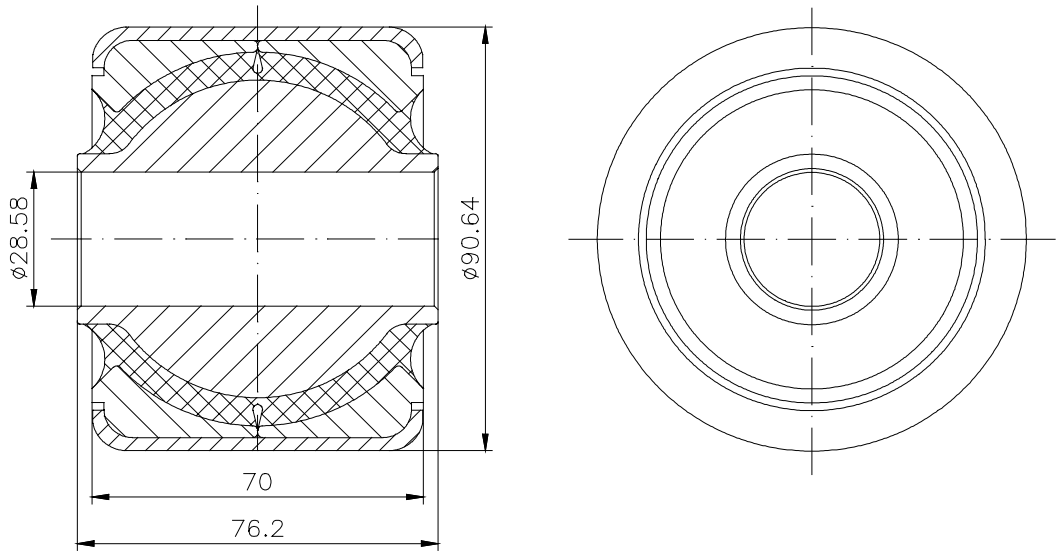

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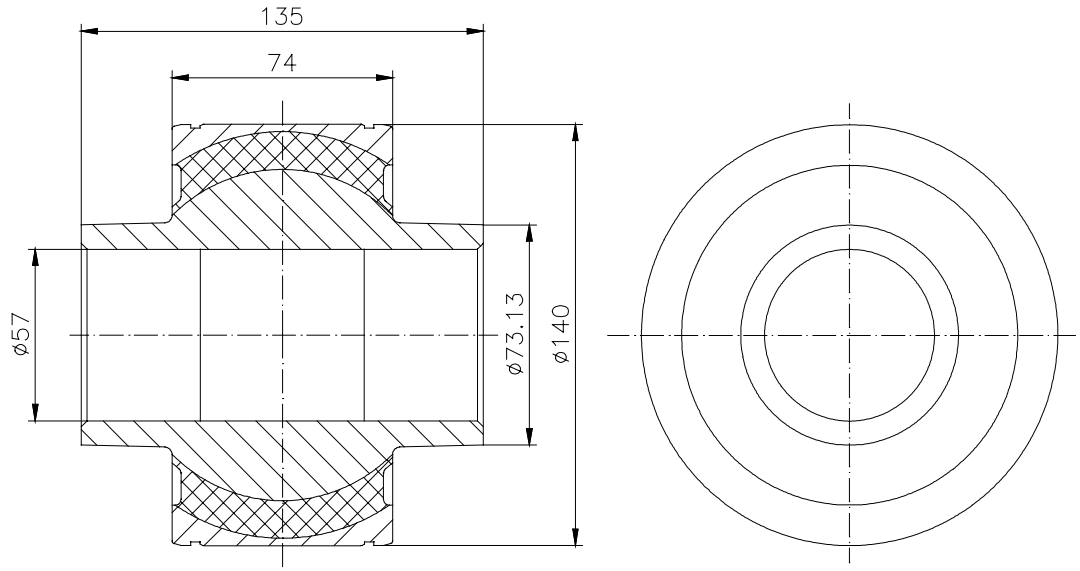

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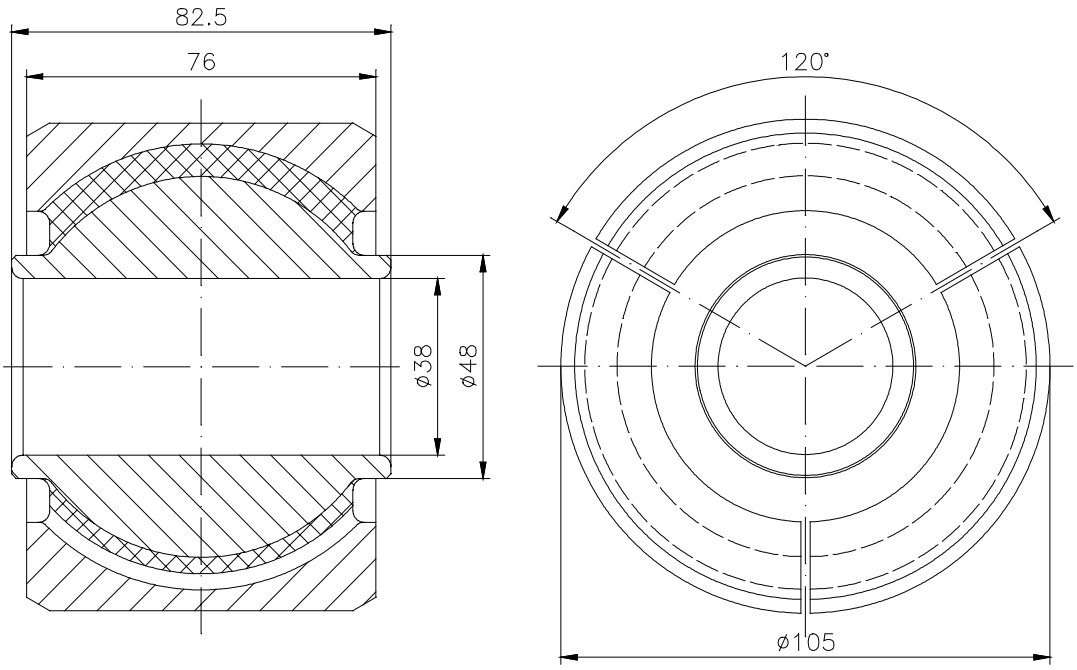

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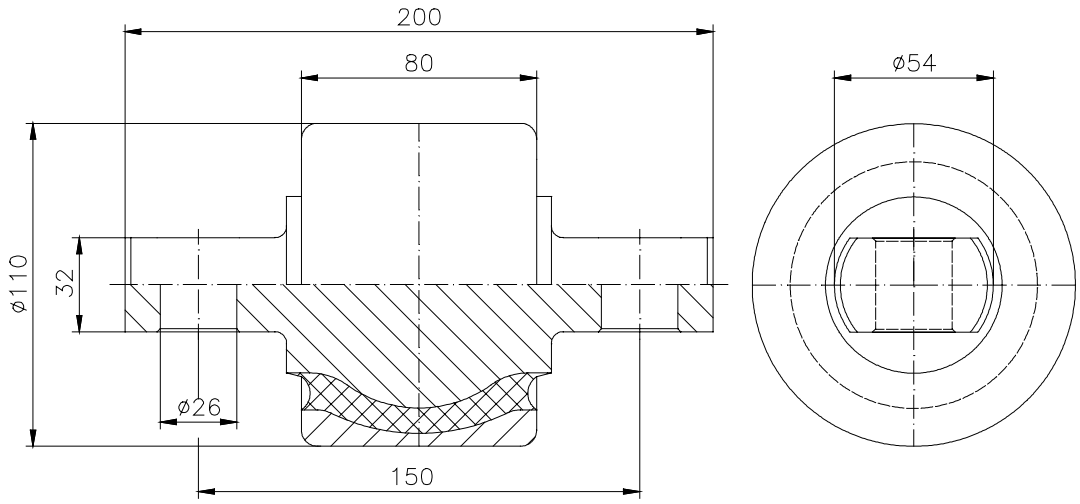

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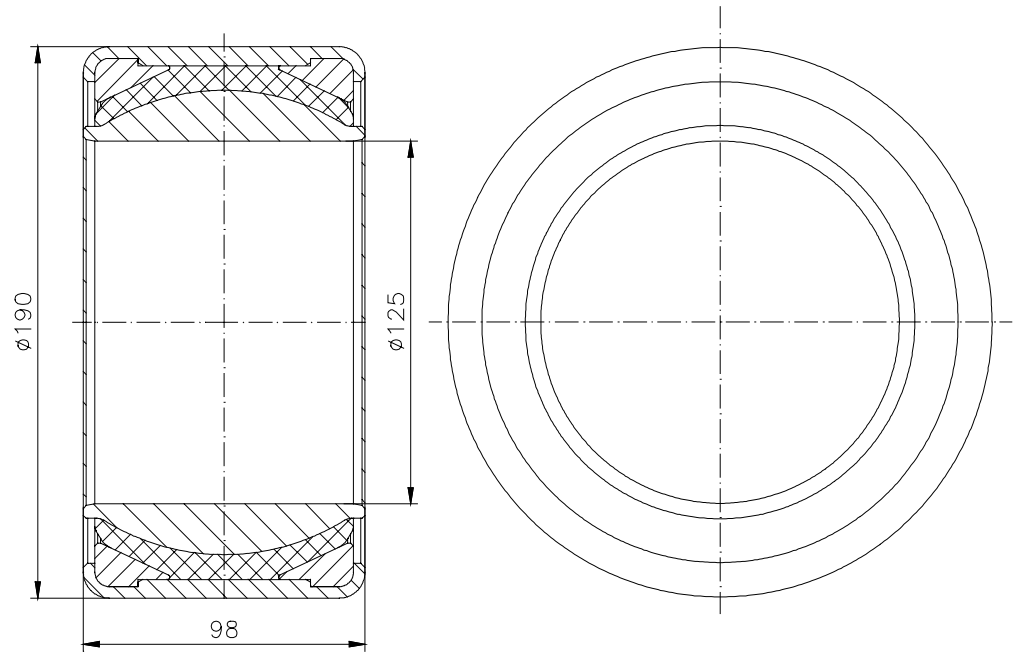

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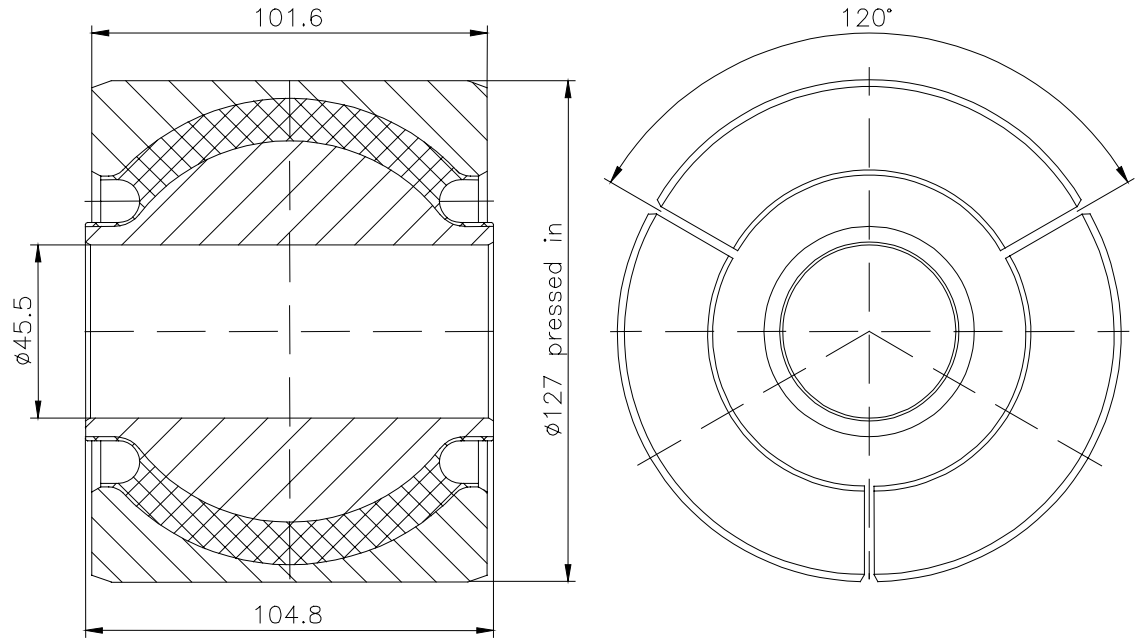

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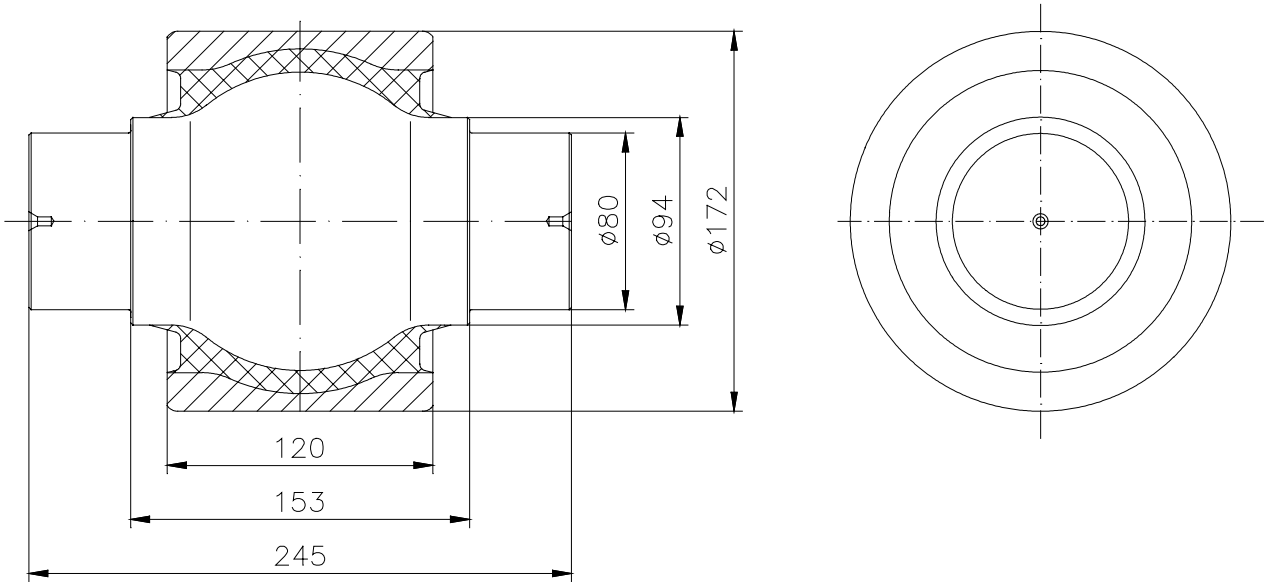

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