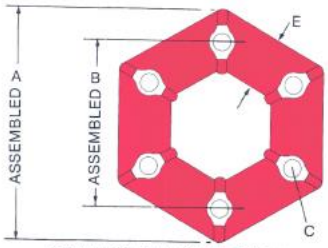
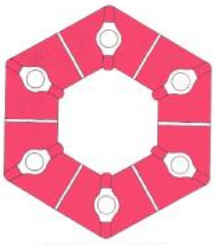
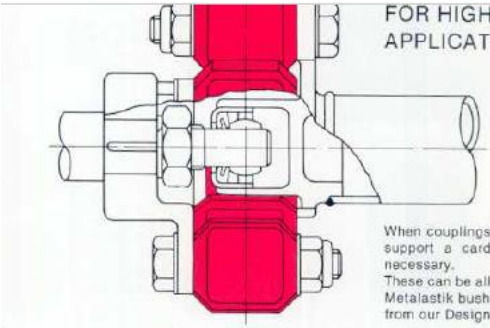
The Metalastik Rotoflex Coupling consists of a regular polygon of rubber with metal inserts bonded in position. It can have 4, 6 or 8 sides. After moulding, the rubber elements in the coupling are compressed by the fitting of a steel retaining band. This important design feature ensures maximum fatigue life. The retaining band is discarded after assembly. Metal interleaves bonded into the rubber elements provide increased torque capacity when required. Rotoflex couplings have proved highly successful for motor car propeller and half-shaft applications for auxiliary drives on road vehicles and for many industrial drives.



RETAINING BANDS NOT SHOWN


INTERLEAF TYPE



FOR HIGH-SPEED APPLICATIONS

AUTOMOTIVE PROPELLER SHAFTS etc.

When couplings operate at very high speeds and support a cardan shaft, a centring device is necessary.
These can be all metal, as shown in diagram, or a Metalastik bush arrangement – details available from our Design Department.

Our engineers will be pleased to advise on any application on receipt of the following – torque, speed and misalignment

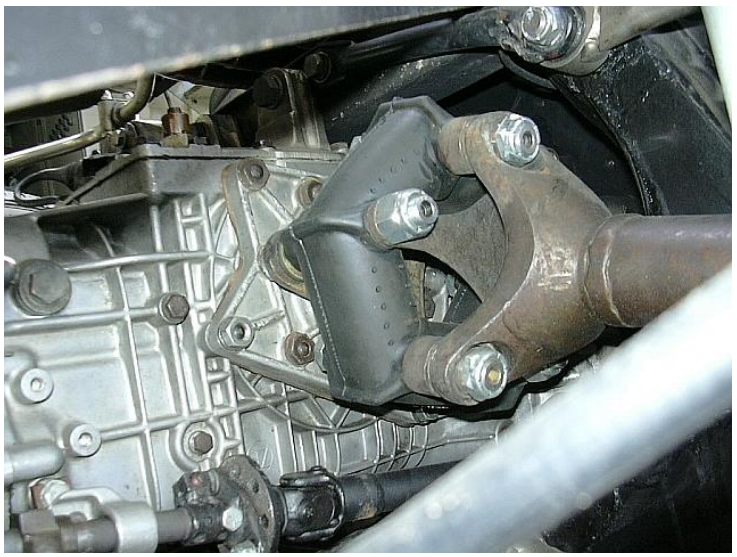
PART No.		A OVERALL DIAMETER (ASSEMBLED)	B P.C.D. OF BOLT CENTRES (ASSEMBLED)	C DIAMETER OF FIXING HOLES	D WIDTH ACROSS METAL FACES	E DIAMETER OF RUBBER CROSS SECTION
21/555/1	mm.	91	65	8	28	22
	ins.	3·58	2·58	·32	1·10	·87
21/1026/1	mm.	117	85	10	32	27
	ins.	4·61	3·35	·39	1·26	1·06
21/892/1	mm.	137	96	11	46	33 SQUARE
	ins.	5·38	3·78	·45	1·83	1·3 SQUARE
21/932/1	mm.	162	113	13	47	37 × 42
	ins.	6·38	4·44	·52	1·84	1·44 × 1·66
21/967/1	mm.	137	96	11	46	33 SQUARE
	ins.	5·38	3·78	·45	1·83	1·3 SQUARE
21/979/1	mm.	162	113	13	47	37 × 42
	ins.	6·38	4·44	·52	1·84	1·44 × 1·66
21/924/1	mm.	187	133	16	57	44
	ins.	7·38	5·25	·64	2·25	1·75
21/524/1	mm.	234	170	20	62	50
	ins.	9·21	6·69	·79	2·44	1·97
21/933/1	mm.	187	133	16	70	44 × 57
	ins.	7·38	5·25	·64	2·75	1·75 × 2·25
21/525/1	mm.	254	186	20	68	56
	ins.	10·00	7·32	·79	2·68	2·20
21/526/1	mm.	281	210	20	78	60
	ins.	11·06	8·27	·79	3·07	2·36

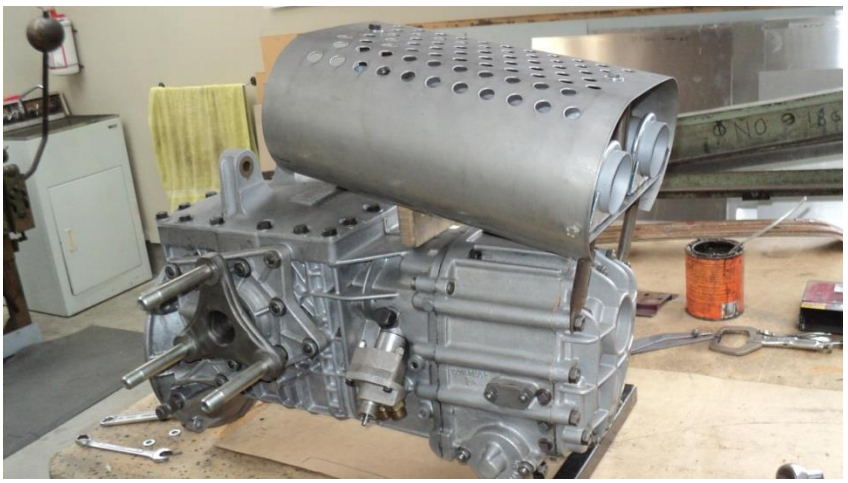
Part Nos. 21/967/1 and 21/979/1 have interleaves Part No. 21/526/1 has 8 rubber elements.

PART No.	TORQUE NORMAL Nm.	TORQUE NORMAL lb.ft.	TORQUE MAXIMUM Nm.	TORQUE MAXIMUM lb.ft.	TORSIONAL STIFFNESS Nm./deg. lb.ft./deg.	AXIAL STIFFNESS kN/m.	AXIAL STIFFNESS lb.in.	NORMAL CONTINUOUS AXIAL DEFLECTION mm.	NORMAL CONTINUOUS AXIAL DEFLECTION ins.	NORMAL CONTINUOUS CARDAN DEFLECTION degrees
21/555/1	40	30	100	75	5,4 4	55	310	2,54	0·10	5
21/1026/1	80	60	200	145	10,8 8	60	345	4,06	0·16	5
21/692/1	190	140	460	340	27 20	115	650	5,08	0·20	5
21/932/1	240	180	600	440	32 24	105	590	6,35	0·25	5
21/967/1	280	210	680	500	37 27	115	650	5,08	0·20	5
21/979/1	340	250	830	610	45 33	105	590	6,35	0·25	5
21/924/1	450	330	1080	800	65 48	160	890	7,62	0·30	5
21/524/1	550	405	1400	1030	65 48	80	450	8,89	0·35	5
21/933/1	570	420	1360	1000	75 55	255	1450	3,81	0·15	3
21/525/1	800	590	1990	1470	102 75	105	600	9,40	0·37	5
21/526/1	1190	880	2980	2200	190 140	175	1000	7,62	0·30	3

Larger continuous cardan deflections can be accommodated in certain applications. For shock and bump loads increase the above figures by a factor of 3.
The couplings listed will cater for running speeds up to 8,000 r.p.m. for the smallest size, and up to 2,000 r.p.m. for the largest size.

Ford GT40 original design doughnut size 5.25 pcd
all-up weight of just under a ton, a power output of at least 335b.h.p





Wiki GT40 64-66 race car

Wt	1200 lbs	817 Kg
Wheel base	95″	2413
Track f & r	54″	1372

Assume mu = 1.2 in '64 and 1.5 in 2022 & no downforce at lower speeds

2004 thread

a/ GT40s are about 44 – 56 to 43 – 57 front / rear.

b/ We have been doing chassis setup on our MK4 and with 1/2 tank of gas and my fat arse the car weighs 2650 with a 38-62 weight distribution. Centre of gravity is right at the tip of the water pump, 14.8" off the ground with a 3" ride height.

Static Wt distribution using practical data

Front 2650*0.38 = 1007 lbf

Rear 2650*0.62 = 1643 lbf

Rear wheel tyre OD = 15" rim, x 9" wide, (guess 60% aspect so 10.8" high) = 25.8" dia

WOT For/Aft Acceleration moment for mu = 1.5

Mom abt Rf

(2650*1.5*14.5) - (Rr*95) = 0

57,637/95 = Rr

Rr = 606 lbf (rear pair)

Sum V = 0

606 + Rf = 0

Rf = - 606 lbf (front pair) (the CoG horiz position does not matter because we are resisting a torque)

Total rear wheel vertical load at WOT = 1643 + 606 = 2,250 lbf

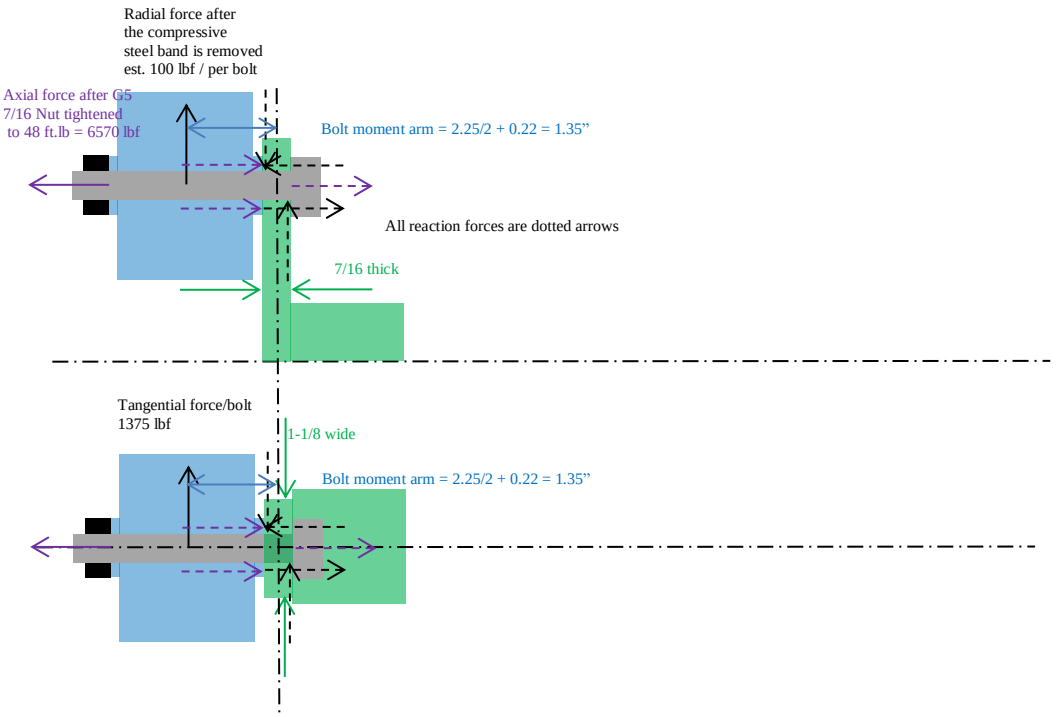
Total traction = 2250 *1.5 = 3374 lbf (traction per axle = 1687 lbf)

Therefore max acceleration = 3374/2650 = 1.27 g's

Per axle traction = 1678 lbf

Torque per axle = 1678*(12.9/12) = 1804 ft.lb = 2446 N.m

Force/bolt (tangent) = 1804/(6*(2.625/12)) = 1375 lbf



Standard solution is to use a G5 bolt (yield strength 92,000 psi) ideally with smooth coupling hole faces

Radial BM = 100*1.35 = 135 in.lbs
I_{bolt} (7/16) = 0.0018 in^4 (A = 0.15 in^2)
σ = My/I = 135*0.219/0.0018
σ = 16,425 psi

Tangential BM = 1375*1.35 = 1856 in.lbs
I_{bolt} (7/16) = 0.0018 in^4 (A = 0.15 in^2)
σ = My/I = 1856*0.219/0.0018
σ = 225,840 psi

So, it the bolt was done up "finger tight" with no axial loading at the tripod face, it would fail immediately.

The bolt tightness and the mid span loads create axial reaction forces which accept a lot of the bending moment such that the bolt bending stress is less than 92,000 psi, so it does not fail in immediate overload, but will fail in high cycle fatigue sooner or later.
On the spot welded versions the hole end face is very small in size and uneven, so the local stresses will be much higher and moments smaller.
The faces will fret and whatever initial bolt tension (stretch) will be lost, and at this time bolt failure will occur.

Using a grade 8 bolt would make a small difference due to its strength which is = to 4140 H&T to RC32, uts 153,000 yield 131,000 psi.

Regarding the 21/924/1 coupling limits.

21/924/1	mm.	187	133	16	57	44
	ins.	7·38	5·25	·64	2·25	1·75

21/924/1	450	1080	65	160	7,62	5
	330	800	48	890	0·30	

Torque per axle = 1678*(12.9/12) = 1804 ft.lb = 2446 N.m is more than double the specified max of 800 ft.lbs.

This suggests to me not to go much over the spec max and this will reduce the bolt bending moments as well.

It looks like a 21/525/1 coupling with a 7.32" pcd and ¾" bolts could do it.