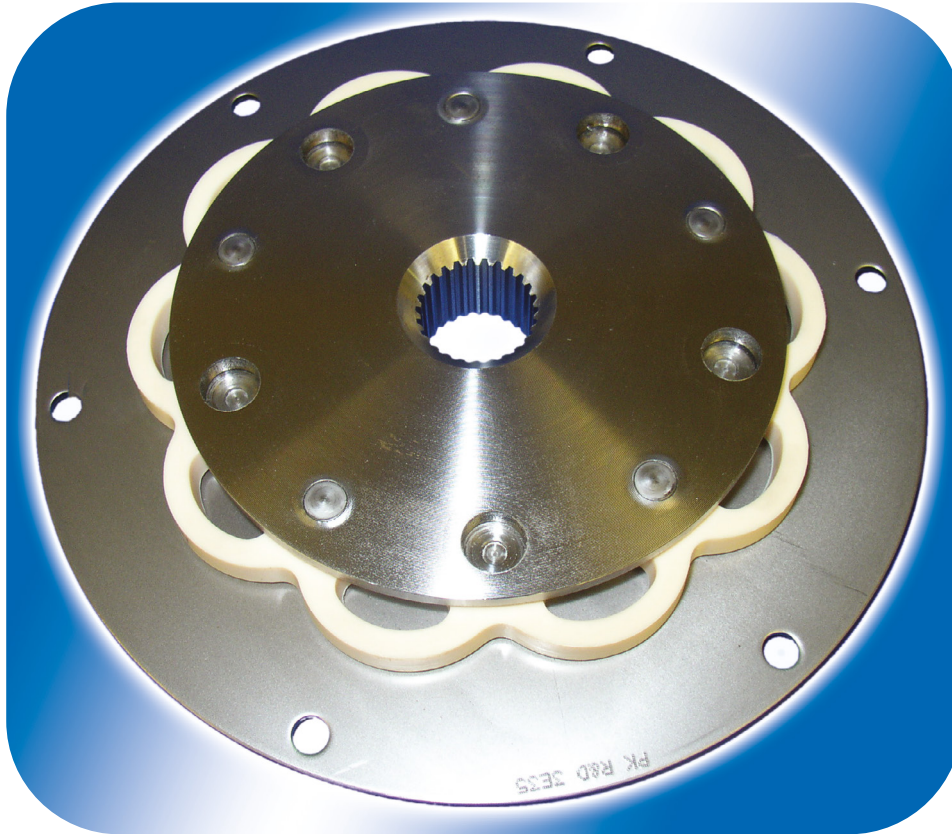


## Damper Drive Plates



R & D Marine has developed a wide range of competitively priced Damper Drive Plates to fit most engine/gearbox combinations.

The R & D Damper Drive Plates reduce gear noise and allow the engine to run at lower speeds.

Linear Stiffness elements for general applications and High-Deflection elements to stop gear noise and spline wear at slow speeds.

All dampers are designed to be Fail-Safe and maintain the drive if the flexible element fails.

The flexible elements are made from a Polyester Elastomer which has good heat qualities and is not affected by salt water, diesel and lubrication oils.

Non-standard items are available for special installations, maximum back plate diameter of 533mm (21.0").

Installation is made quick and easy as the R & D Damper Drive Plate requires no machining and is ready to bolt to the flywheel.

Products are available ex-stock and worldwide through our distribution network.

- For engines up to 800 HP
- Torque range 60-1400 lb ft
- Reduces gear noise
- Allows engine to run at lower speeds
- Fail safe design
- Machined ready to install
- Elements suitable for every application
- Element has good heat qualities
- Special back plates up to 533mm (21.0") diameter
- Element is impervious to salt water, diesel and lubrication oils
- Wide range of stock
- Competitively priced
- No springs to rust or fret
- Worldwide availability

# R & D Marine Damper Drive Plates

## Element Selection

Consider the following criteria when making a decision on the element design.

**High Deflection (H/D)** Softer than our other designs with a maximum deflection up to 30 degrees, slightly larger diameter element than other designs and can only be fitted to rotate in the standard direction of rotation (anti-clockwise looking at the flywheel). With the element facing the gearbox. Suitable for work boats with slow speed applications and pleasure boats.

**Hammer Head** More torsionally flexible than the loop type, usually has smaller diameter element than our other designs but still retains the ability to be mounted either way round on the flywheel and rotate in either direction. Three stage stiffness with up to 9 degrees of deflection.

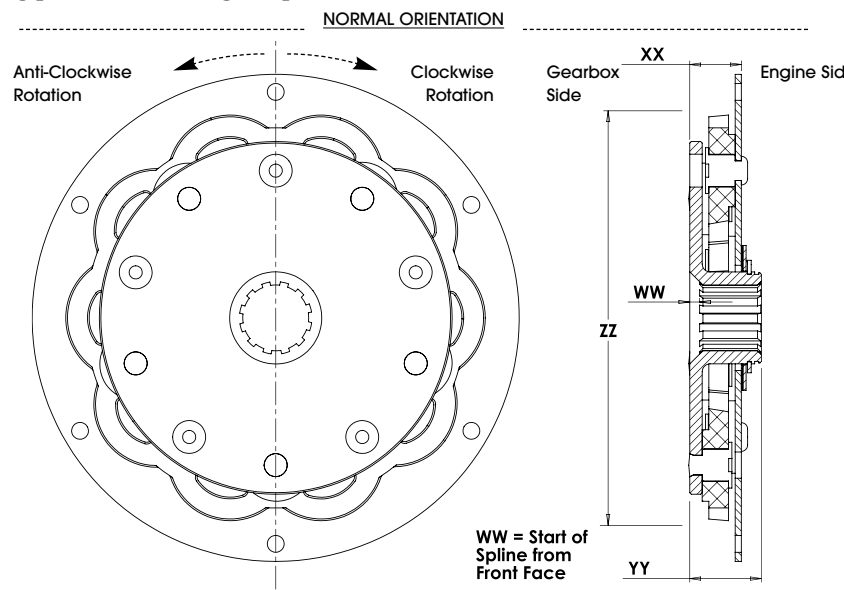
**Loop type** General purpose robust element which can be mounted either way round on the flywheel and can rotate in either direction. Linear stiffness up to 3 degrees of deflection.

## Details required for Damper Selection

1. Manufacturer of Engine, Engine Horse Power, Engine Speed, Number of cylinders
2. Manufacturer of Gearbox, Model Number and Input Spline Details.
3. Back plate diameter, Number of holes, Size of holes, Pitch circle diameter of holes, Are they equally spaced?  
Does the plate fit on the face of the flywheel or locate in a register?
4. Will the element of the Drive Plate fit on the outside of the flywheel or be reversed and fit inside a flywheel recess?
5. Type of application. Pleasure or Work Boat? Does it spend long periods at low engine speeds  
• If an existing installation with a failed part •
6. Type and Part Number of Damper that has failed
7. What has failed. Spline or Element/Springs?

## Gearbox Spline Details

Gearbox	Spline	Spline Dia	
		mm	inch
<b>Borg Warner</b>			
71, 72, 73, 5000	26T 20/40 DP	35.4	1.394
1000, 1500	22T PA 30	18.5	0.729
500	10T B10 x 23 x 29 DIN 5464	29.0	1.142
7000	SAE 1.500 x 10T	38.1	1.50
<b>Newage PRM</b>			
Delta	17T 24/48 DP	19.7	0.776
80, 120, 150	10T B10 x 23 x 29 DIN 5464	29.0	1.142
100, 101, 140, 160, 260	SAE 1.000 x 10T	25.4	1.000
175, 250, 265, 310	SAE 1.125 x 10T	28.6	1.125
301. 302, 401, 402, 500, 750	17T 16/32 DP	28.84	1.135
In-Line 301, 302, 401 402, 500, 750	26T 20/40 DP	35.4	1.394
601, 1000	18T 12/24 DP	40.5	1.595
1200, 1500	20T 12/24 DP	44.8	1.761
<b>Paragon</b>			
P Series	26T 20/40 DP	35.4	1.394
<b>Parsons</b>			
	SAE 1.500 x 10T	38.1	1.50
<b>Self Change Gear</b>			
MRF 350HD	32T 16/32 DP	52.3	2.060
MRF 350	SAE 1.625 x 10T	41.3	1.625
<b>Technodrive</b>			
TMC 30, 40, 50, 60	10T B10 x 23 x 29 DIN 5464	29.0	1.142
TM 93, 170, 260, 345 485, 545, 880	26T 20/40 DP	35.4	1.394
<b>TMP</b>			
1200, 1500	26T 20/40 DP	35.4	1.394
<b>Twin Disc</b>			
502, 501	26T 20/40 DP	35.4	1.394
<b>Volvo</b>			
140 Leg Old 270-280 Leg	SAE 1.000 x 10T	25.4	1.000
MS3, 4, 5, HS1 Sail Drive 110 110S, New 270-280 Leg	26T 20/40 DP	35.4	1.394
120 Leg, MS 120SB, 120SC	20T 30PA 24/48 DP	22.6	0.89
<b>Yanmar</b>			
Kanzaki, SD20 Sail Drive	20T 30PA 24/48 DP	22.6	0.89
<b>ZF - Hurth</b>			
HBW 35, 40, 50, 100, 125, 150	10T B10 x 23 x 29 DIN 5464	29.0	1.142
HSW 125			
HBW 250, 360	26T 20/40 DP	35.4	1.394
HSW 450, 630, 800			
IRM 220A	26T 20/40 DP	35.4	1.394



## Element Details

Torque		Design	Code	Element Fixing	Rotation (When Facing Fly Wheel)
Nm	lb ft				
<b>HIGH DEFLECTION</b>					
135	100	H/D	AM	3 x 0.375 (4.00)	Anti-Clockwise
251	185	H/D	AP	4 x 0.375 (6.00)	Anti-Clockwise
270	200	H/D	AN	4 x 0.375 (6.00)	Anti-Clockwise
405	300	H/D	AL	4 x 0.375 (6.50)	Anti-Clockwise
670	500	H/D	AD	4 x 0.500 (8.00)	Anti-Clockwise
940	700	H/D	AE	4 x 0.500 (10.25)	Anti-Clockwise
<b>HAMMER HEAD</b>					
135	100	Hammer	W	3 x 0.375 (4.00)	Either
215	160	Hammer	D	5 x 0.375 (5.59)	Either
340	250	Hammer	Y	5 x 0.500 (5.59)	Either
405	300	Hammer	AJ	3 x 0.500 (4.50)	Either
420	310	Hammer	L	5 x 0.375 (5.59)	Either
475	350	Hammer	U	5 x 0.500 (5.59)	Either
745	550	Hammer	R	5 x 0.500 (5.59)	Either
<b>LOOP TYPE</b>					
80	60	Loop	A	3 x 0.375 (4.00)	Either
135	100	Loop	B	3 x 0.375 (4.00)	Either
245	180	Loop	E	5 x 0.375 (5.59)	Either
270	200	Loop	F	3 x 0.500 (4.50)	Either
340	250	Loop	G	5 x 0.375 (5.59)	Either
360	270	Loop	H	4 x 0.500 (4.50)	Either
405	300	Loop	J	3 x 0.500 (4.50)	Either
445	330	Loop	K	5 x 0.500 (5.59)	Either
540	400	Loop	M	5 x 0.375 (5.59)	Either
610	450	Loop	N	4 x 0.500 (4.50)	Either
610	450	Loop	V	5 x 0.500 (5.59)	Either
745	550	Loop	P	5 x 0.500 (5.59)	Either
1015	750	Loop	S	5 x 0.500 (5.59)	Either
1630	1200	Loop	Z	6 x 0.625 (10.2)	Anti-Clockwise
1630	1200	Loop	AF	6 x 0.625 (10.2)	Clockwise
1901	1400	Loop	AH	6 x 0.625 (10.2)	Anti-Clockwise

# Damper Selection Procedure

- Example**
- 1) Ford 150 HP at 2500 RPM 6 Cylinder
  - 2) Borg Warner Velvet Drive 72C Spline 26 teeth 20/40 DP 1.394 diameter
  - 3) Back Plate diameter 14.250, fixing holes 6 x 0.375 diameter on 13.500 pcd spaced in 3 groups of 2. No register
  - 4) Element fits on outside of flywheel
  - 5) Work Boat with a lot of slow speed work.

The R & D Damper comprises 3 main components, Spline plate, Element and Back plate, these 3 components are given a code which make up the finished part number. The following procedure will lead you through the selection process.

1. Select the correct power and style of element for the application .

Use the manufacturers maximum torque figure for the engine or calculate from the known data of maximum horsepower rating at what rpm. Using the example installation above we get 315 lb ft or 427 Nm

To calculate output Torque of engine

$$\frac{\text{Horse Power of Engine} \times 5250}{\text{Engine Speed}} = \text{Torque lbft} \quad \frac{150 \times 5250}{2500} = 315 \text{ lb ft} \quad \left| \quad \frac{\text{Horse Power of Engine} \times 7123}{\text{Engine Speed}} = \text{Torque Nm} \quad \frac{150 \times 7123}{2500} = 427 \text{ Nm}$$

From the Element selection chart we see the most suitable element has a code of AD and a fixing of 4 x 0.500 (8.00)

2. Select the correct Spline Plate to suit the Gearbox Input Shaft

Using the example, go to the Gearbox Details to find the Borg Warner 72 has a 26 Tooth 20/40 DP input spline. In the Selection Chart below look down the Element Fixing column find 4 x 0.500 (8.00) looking across find the 26T 20/40 DP input spline, in the next column is the correct code of 48 for the spline plate. The furthest column to the right gives the reference number of the Back Plates available for this Element fixing, in this case List 7

3. Select the correct Back Plate to suit the Flywheel

Using the example, go to the Back Plate List on page 4. Looking down the list find the matching bolt pattern, in this case Back Plate 2

Damper Required for this example      Spline Plate       Element       Back Plate

Spline	Spline Plate No	Element Code		Element Fixing	Damper Dimensions					Back Plate Ref					
		Group 1 (ZZ1)	Group 2 (ZZ2)		Black mm			Red inches							
					WW	XX	YY	Group 1 ZZ 1	Group 2 ZZ 2						
22T PA 30	1	<b>AM</b>		3 x 0.375 (4.00)	0.0	0.00	25.4	1.00	32.0	1.25	127	5.00	4, 8 37, 43 49, 60 91, 95		
26T 20/40 DP	2				2.3	0.09	25.4	1.00	32.0	1.25	127	5.00			
17T 24/48 DP	12				0.0	0.00	25.4	1.00	32.0	1.25	127	5.00			
1.000 x 10 SAE	13				0.0	0.00	25.4	1.00	32.0	1.25	127	5.00			
10T DIN 5464	22				0.0	0.00	25.4	1.00	32.0	1.25	127	5.00			
20T 30PA 24/48 DP	66	<b>AP, AN</b>		4 x 0.375 (6.00)	0.0	0.00	25.4	1.00	32.0	1.25	127	5.00	8, 37 49, 60 91, 94		
26T 20/40 DP	42				5.0	0.20	25.4	1.00	35.0	1.38	182	7.13			
10T DIN 5464	43				0.0	0.00	25.4	1.00	35.0	1.38	182	7.13			
17T 24/48 DP	44				0.0	0.00	25.4	1.00	35.0	1.38	182	7.13			
17T 16/32 DP	46				1.8	0.07	25.4	1.00	35.0	1.38	182	7.13			
1.000 x 10 SAE	45	<b>AL</b>		4 x 0.375 (6.50)	2.3	0.09	25.4	1.00	35.0	1.38	182	7.13	145, 146 147, 148 149		
20T 30PA 24/48 DP	65				0.0	0.00	25.4	1.00	35.0	1.38	182	7.13			
26T 20/40 DP	71				12.5	0.49	26.4	1.04	34.0	1.34	194	7.64			
26T 20/40 DP	76				5.0	0.20	26.4	1.04	34.0	1.34	194	7.64			
10T DIN 5464	72				0.0	0.00	26.4	1.04	34.0	1.34	194	7.64			
17T 16/32 DP	73	<b>D, L,</b>	<b>E, G, M</b>	5 x 0.375 (5.93)	2.6	0.10	26.4	1.04	34.0	1.34	194	7.64	1, 2 3, 5 17, 25 35, 36 40		
1.000 x 10 SAE	74				1.0	0.04	26.4	1.04	34.0	1.34	194	7.64			
20T 30PA 24/48 DP	75				5.0	0.20	25.4	1.00	35.0	1.38	175	6.90		207	8.13
26T 20/40 DP	3				5.0	0.20	25.4	1.00	35.0	1.38	175	6.90		207	8.13
26T 20/40 DP	5				2.3	0.09	25.4	1.00	35.0	1.38	175	6.90		207	8.13
1.125 x 10 SAE	16	<b>Y, U, R,</b>	<b>K, V, P</b>	5 x 0.500 (5.93)	2.3	0.09	25.4	1.00	35.0	1.38	175	6.90	207	8.13	1, 2 3, 5 17, 25 35, 36 40
17T 16/32 DP	18				1.8	0.07	25.4	1.00	35.0	1.38	175	6.90	207	8.13	
10T DIN 5464	23				0.0	0.00	25.4	1.00	35.0	1.38	175	6.90	207	8.13	
17T 24/48 DP	32				0.0	0.00	25.4	1.00	35.0	1.38	175	6.90	207	8.13	
26T 20/40 DP	4				5.0	0.20	28.7	1.13	35.0	1.38	182	7.13	207	8.13	
26T 20/40 DP Long	9	<b>S</b>		5 x 0.500 (5.93)	0.0	0.00	28.7	1.13	43.0	1.69	182	7.13	207	8.13	14, 15 52
18T 12/24 DP	21				0.0	0.00	28.7	1.13	38.1	1.50	182	7.13	207	8.13	
17T 16/32 DP	31				1.8	0.07	28.7	1.13	35.0	1.38	182	7.13	207	8.13	
32T 16/32 DP	26				0.0	0.00	38.5	1.52	57.2	2.25			207	8.13	
1.625 x 10	27				0.0	0.00	28.7	1.13	38.1	1.50			207	8.13	
1.500 x 10	11	<b>H, N</b>		4 x 0.500 (4.50)	0.0	0.00	28.7	1.13	38.1	1.50	182	7.13	207	8.13	6, 13
PR 1500	54				0.0	0.00	63.2	2.49	79.3	3.12			207	8.13	
26T 20/40 DP	4				5.0	0.20	31.8	1.25	35.0	1.38	207	8.13			
26T 20/40 DP Long	9				0.0	0.00	31.8	1.25	43.0	1.69	207	8.13			
18T 12/24 DP	21				0.0	0.00	31.8	1.25	38.1	1.50	207	8.13			
32T 16/32 DP	26	<b>AJ</b>		3 x 0.500 (4.50)	0.0	0.00	41.7	1.64	57.2	2.25	207	8.13	7		
1.625 x 10	27				0.0	0.00	31.8	1.25	38.1	1.50	207	8.13			
1.500 x 10	11				0.0	0.00	31.8	1.25	38.1	1.50	207	8.13			
PR 1500	54				0.0	0.00	66.3	2.61	79.3	3.12	207	8.13			
26T 20/40 DP	6				5.0	0.20	29.5	1.16	36.0	1.41	183	7.19			
26T 20/40 DP HT	8	<b>F, J,</b>		4 x 0.500 (8.00)	5.0	0.20	29.5	1.16	36.0	1.41	183	7.19	1, 2, 3 5, 17 25, 34		
1.500 x 10	10				0.0	0.00	29.5	1.16	36.0	1.41	183	7.19			
1.500 x 10 SAE	17				2.3	0.09	29.5	1.16	36.0	1.41	183	7.19			
17T 16/32 DP	19				1.8	0.07	29.5	1.16	36.0	1.41	183	7.19			
1.625 x 10	28				0.0	0.00	29.5	1.16	38.1	1.50	183	7.19			
26T 20/40 DP	7	<b>AD</b>		6 x 0.625 (8.00)	8.1	0.32	29.5	1.16	36.0	1.41	158	6.19	78, 79		
1.000 x 10 SAE	15				2.3	0.09	29.5	1.16	36.0	1.41	158	6.19			
17T 16/32 DP	20				1.8	0.07	29.5	1.16	36.0	1.41	158	6.19			
17T 24/48 DP	41				1.8	0.07	29.5	1.16	36.0	1.41	158	6.19			
26T 20/40 DP	48				6.0	0.24	29.0	1.14	36.0	1.41	235	9.25			
17T 16/32 DP	49	<b>Z, AF</b>		6 x 0.625 (8.00)	1.8	0.07	29.0	1.14	36.0	1.41	235	9.25	1, 2, 3 5, 17 25, 34		
26T 20/40 DP	57				0.0	0.00	29.0	1.14	36.0	1.41	235	9.25			
32T 16/32 DP	40				0.0	0.00	44.2	1.74	57.2	2.25	330	13.00			
PR 1500	55				0.0	0.00	68.6	2.70	79.3	3.12	330	13.00			
26T 20/40 DP	56				0.0	0.00	44.2	1.74	51.6	2.03	330	13.00			
32T 16/32 DP	40	<b>AH</b>		6 x 0.625 (8.00)	0.0	0.00	47.3	1.86	57.2	2.25	330	13.00	78, 79		
PR 1500	55				0.0	0.00	71.9	2.83	79.3	3.12	330	13.00			
26T 20/40 DP	56				0.0	0.00	47.3	1.86	51.6	2.03	330	13.00			
26T 20/40 DP	50				0.0	0.00	31.8	1.25	39.0	1.53	302	11.88			
18T 12/24 DP	51				0.0	0.00	31.8	1.25	39.0	1.53	302	11.88			
17T 16/32 DP	52	<b>AE</b>		4 x 0.500 (10.25)	0.0	0.00	31.8	1.25	39.0	1.53	302	11.88	101, 103		
					0.0	0.00	31.8	1.25	39.0	1.53	302	11.88			



## Back Plate Details

Ref	O/D Met	O/D Imp	Flywheel Fixing Metric	Flywheel Fixing Imperial	Remarks
1	298.5	11.75	6 x 8.1 on 200 6 x 8.1 on 250 6 x 8.1 on 269.9 6 x 8.1 on 273	6 x .32 on 7.875 6 x .32 on 9.843 6 x .32 on 10.625 6 x .32 on 10.75	
2	362	14.25	6 x 8.1 on 200 6 x 8.1 on 210 6 x 8.1 on 263 6 x 8.1 on 269.9 6 x 8.1 on 276.3 6 x 8.1 on 289 6 x 8.1 on 295.3 6 x 8.8 on 304.8 6 x 8.1 on 314.4 6 x 9.5 on 320.7 12 x 9.5 on 343 Ford	6 x .32 on 7.875 6 x .32 on 8.268 6 x .32 on 10.375 6 x .32 on 10.625 6 x .32 on 10.875 6 x .32 on 11.375 6 x .32 on 11.625 6 x .344 on 12.00 6 x .32 on 12.375 6 x .375 on 12.625 12 x .375 on 13.5 Ford	
3	336.5	13.24	6 x 8.1 on 200 6 x 8.1 on 210 6 x 8.1 on 263 6 x 8.1 on 269.9 6 x 8.1 on 276.3 6 x 8.1 on 289 6 x 8.1 on 295.3 6 x 8.8 on 304.8 6 x 8.1 on 314.4 6 x 9.5 on 320.7	6 x .32 on 7.875 6 x .32 on 8.268 6 x .32 on 10.375 6 x .32 on 10.625 6 x .32 on 10.875 6 x .32 on 11.375 6 x .32 on 11.625 6 x .344 on 12.00 6 x .32 on 12.375 6 x .375 on 12.625	
4	155.45	6.12	5 x 6.35 on 142	5 x .25 on 5.593	
5	352.5	13.875	8 x 10.6 on 333.4	8 x .416 on 13.125	SAE 11.5
6	202.6	7.978	8 x 8.1 on 181	8 x .32 on 7.125	
7	180.8	7.12	9 x 6.35 on 167.4	9 x .25 on 6.589	
8	298.5	11.75	6 x 8.1 on 200 6 x 8.1 on 250 6 x 8.1 on 269.9 6 x 8.1 on 273	6 x .32 on 7.875 6 x .32 on 9.843 6 x .32 on 10.625 6 x .32 on 10.75	
13	234	9.212	6 x 13.1 on 210	6 x .515 on 8.267	
14	352.5	13.875	8 x 10.6 on 333.4	8 x .416 on 13.125	SAE 11.5
15	362	14.25	12 x 9.5 on 342.9	12 x .375 on 13.50	Ford
17	314.3	12.375	6 x 8.1 on 200 6 x 8.1 on 250 6 x 8.1 on 269.9 6 x 8.1 on 273 8 x 10.6 on 296	6 x .32 on 7.875 6 x .32 on 9.843 6 x .32 on 10.625 6 x .32 on 10.750 8 x .416 on 11.625	SAE 10

Ref	O/D Met	O/D Imp	Flywheel Fixing Metric	Flywheel Fixing Imperial	Remarks
25	287.4	11.312	6 x 9.1 on 269.96 6 x 6.3 on 269.96	6 x .356 on 10.625 3 x .25 on 10.625	TAMD 40
34	466.7	18.375	8 x 13.5 on 438.15	8 x .53 on 17.250	SAE 14
35	263.5	10.375	6 x 9.5 on 244.5	6 x .375 on 9.625	SAE 8
36	266.7	10.5	12 x 8.1 on 222.3 6 x 8.1 on 244.5 Spaced 3 groups of 2 apart 23°59'07 12 x 8.1 on 246 12 x 8.1 on 242	12 x .32 on 8.750 6 x .32 on 9.625 Spaced 3 groups of 2 apart 23°59'07 12 x .32 on 9.685 12 x .32 on 9.527	Suit Ford XLD And Mitsubishi
37	266.7	10.5	12 x 8.1 on 222.3 6 x 8.1 on 244.5 Spaced 3 groups of 2 apart 23°59'07 12 x 8.1 on 246 12 x 8.1 on 242	12 x .32 on 8.750 6 x .32 on 9.625 Spaced 3 groups of 2 apart 23°59'07 12 x .32 on 9.685 12 x .32 on 9.527	Suit Ford XLD And Mitsubishi
40	241.3	9.500	8 x 8.5 on 222.25	8 x .334 on 8.750	SAE 7.5
43	263.5	10.375	6 x 9.5 on 244.5	6 x .375 on 9.625	SAE 7.5
49	241.3	9.500	8 x 8.5 on 222.25	8 x .334 on 8.750	Beta
60	215.9	8.500	6 x 8.1 on 200	6 x .32 on 7.875	SAE 6.5
78	352.5	13.875	8 x 10.6 on 333.4	8 x .416 on 13.125	SAE 11.5
79	466.7	18.375	8 x 13.5 on 438.15	8 x .53 on 17.250	SAE 14
91	314.3 -0.05 -0.13	12.375 -0.002 -0.005 SAE 10	6 x 8.1 on 200 6 x 8.1 on 250 6 x 8.1 on 269.9 6 x 8.1 on 273 8 x 10.6 on 296	6 x .32 on 7.875 6 x .32 on 9.843 6 x .32 on 10.625 6 x .32 on 10.750 8 x .416 on 11.625	SAE 10
94	287.4	11.312	6 x 9.1 on 269.96 6 x 6.3 on 269.96	6 x .356 on 10.625 3 x .25 on 10.625	Trans Auto TAMD 40
95	235	9.250	6 x 8.1 on 222.25	6 x .32 on 8.750	BETA
101	352.5	13.875	8 x 10.6 on 333.4	8 x .416 on 13.125	SAE 11.5
103	466.7	18.375	8 x 13.5 on 438.15	8 x .53 on 17.250	SAE 14
145	215.9	8.500	6 x 8.1 on 200	6 x .32 on 7.875	SAE 6.5
146	241.3	9.500	8 x 8.5 on 222.25	8 x .334 on 8.750	SAE 7.5
147	263.5	10.375	6 x 9.5 on 244.5	6 x .375 on 9.625	SAE 8
148	314.3	12.375	8 x 10.6 on 296	8 x .416 on 11.625	SAE 10
149	352.5	13.875	8 x 10.6 on 333.4	8 x .416 on 13.125	SAE 11.5

The above table shows some of the 160 standard back-plates we produce.

We can manufacture one off specials up to 533mm [21.0"] Ø. Please contact R & D Marine for your requirement. Details below



Designs are subject to constant review and improvement therefore we reserve the right to amend any dimension or detail specified or illustrated in this publication without notice and without incurring any obligation to provide such modification to products previously delivered.

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