

First of all, let me state up front that I make no claim to being a mechanical engineer or powertrain expert. However, in trying to decide on what chain/sprocket combo (ie 520 or 525 chain and what sprockets) to use for my DR650SE when I change/upgrade the chain and sprockets (the bike still has the stock OEM chain and sprockets) I conducted some research on the internet, referring to the various DS forums and vendor sites for info and recommendations.

The following is a summary of my findings and is made available for those dogs who may find it handy. Use it – don't use it, but note that it comes with the usual disclaimers.

OEM chain and sprockets

As a baseline, the Suzuki DR650SE Owner's Manual specifies the stock chain as a (Daido Corporation) D.I.D 525V9 (110 links) - 20 pitch length 319,4mm (12,57")

Sprockets: 15/42 (ratio 2.800) for E-03, 28, 33 models, alternately 15/41 (ratio 2,733) for others

(DRRiders.com report the stock chain on newer DR650SE's as a DID525V8 X-ring endless chain -. The X-ring chain may well be the OEM equipment on later models, replacing the earlier O-ring chain).

So what is the difference between a 520 and a 525 chain and what do the numbers mean?

[Ref: "Chains For Dummies - The Goods On Proper Chain Maintenance"

<http://www.angelfire.com/mo2/tmotorcycle/tech1.html>]

The first number represents the distance between links (or pin to pin from the outside) measured in 1/8-inch (0,125 inch or 3,18mm) increments. A '4' means 4/8s, which is 1/2-inch (12,7mm), '5' is 5/8-inch (15,88mm) and a '6' is 6/8 or 3/4-inch (19,05mm).

So, referring to the Suzuki Owner's Manual specification for the 20 pitch length for the 525 chain = $20 \times 5/8 = 12.5$ inch.

The next two numbers denote the width of the chain at the roller, or the roller width inside the chain plates. This measurement is again measured in 1/8-inch increments. So a 20 is $2 \times 0,125 = 0,250$ (1/4-inch or 6,35mm). A 25 as the last two digits represents $2,5 \times 0,125 = 0,3125$ (5/16-inch or 7.94mm) and a 30 is $3,0 \times 0,125 = 0,375$ (3/8-inch or 9,53mm).

The tensile strength of the chain will be determined by the material and the thickness of the side plates – this will vary from manufacturer to manufacturer and between chains from a single manufacturer, but given the relatively low horsepower and torque of the DR650SE, any good quality chain will do the job

Why move away from the stock sprocket ratio of 15/42?

Many DR650 owners report that the stock gearing of the DR is a little high for slow, technical riding (using the stock carb that is – changing to the Mikuni TM40 Pumper Carburettor is reported to resolve this issue, but this is a whole other technical discussion). Using different combinations of front and rear sprocket sizes allows for a wide range of gearing to be selected by the rider. In addition, the 520 chain is also cheaper. The quote below from DRRider.com about sums it up:

“The bike comes with 525 sprockets and an endless 525 chain. Firstly, 525-section stuff isn't very common and your gearing options are limited. Secondly, 525 stuff is more expensive than more common sizes. Thirdly, every Honda XR/Suzuki DRZ/Yamaha WR has 520 chain/sprockets, so these are much more widely available. Finally, 520 and 525 chains have the same breaking strain. I've just replaced the 14/41T525 sprockets on my bike with 14/43T520, and saved myself AUD\$100 in the process. And unless you carry a chain-breaker and you're not afraid to use it, an endless chain is a stupid idea on a dirt bike. Even if you keep a 525 chain, replace the original with one with a split link so you can work on it in the field.”

Selection of chain size

The OEM chain on the DR650SE is a 525. As stated above, there is a wider range of sprocket sizes generally available in 520. So will the 520 chain be strong enough for the DR650? There have been numerous reports on different DS forums of faster chain wear with riders using the 520 chain and sprockets, but given that there are many more powerful bikes (including the KTM 690) that use a 520 chain, I don't believe this to be an issue for the DR650. Chain maintenance (cleaning and lubrication) is likely to have a far greater impact on chain and sprocket life than the shift to a 520 chain.

There are also reports of the 520 front sprocket causing greater wear of the front counter shaft (expensive) which would negate any economy gains from using the cheaper 520 chain and sprocket. However, this is restricted to the narrower (approximately 7 mm wide 520 sprockets – refer to the JTF437 below which is NOT recommended) – the 520 sprockets (ie JT Sprockets JTF438) listed below have a 10mm wide shoulder (refer to the drawings) where they interface to the counter shaft (same as the OEM 525 front sprocket) and so this is not an issue if the correct 520 front sprockets are selected.

Final Drive ratios:

The table below indicates the final drive ratios that can be obtained with different combinations of (common) front and rear sprocket sizes. The stock OEM front (15 tooth) and rear (42 tooth) sprockets give a final drive ratio of 2,8.

The ratio can be increased to 3,00 by changing the front sprocket to a 14T, but there have been reported issues (including interference and increased chain wear with the smaller front sprocket and so a better option might be to increase the rear sprocket to a 45T to achieve the same ratio (3,00) using the stock (15T) front sprocket.

		Rear Sprocket						
		41T	42T	43T	45T	46T	47T	48T
Front Sprocket	14T	2.93	3.00	3.07	3.21	3.29	3.36	3.43
	15T	2.73	2.80	2.87	3.00	3.07	3.13	3.20
	16T	2.56	2.63	2.69	2.81	2.88	2.94	3.00
	17T	2.41	2.47	2.53	2.65	2.71	2.76	2.82

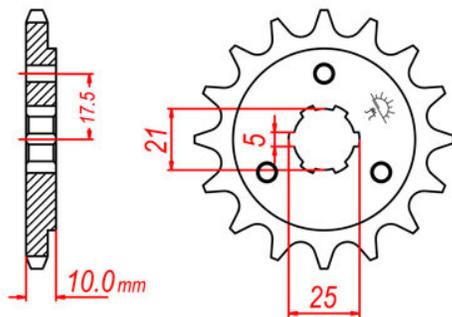
525 Options:

JT Sprockets (<http://www.jtsprockets.com/>) manufacture a range of front and rear sprockets in both 520 and 525 sizes that can be used on the DR650SE. The sprockets below are the recommended sprockets for the 520 and 525 chain sizes.

Note that ProCycle (www.Procycle.us) also specifies and supplies JT sprockets for the DR650SE. (In addition, when I enquired, for comparison purposes, at the Suzuki agent where I purchased my DR650SE what the cost would be of the OEM sprockets, he hauled out his trusty JT Sprockets catalogue and quoted me on exactly the part numbers (JTF1448 and JTR1791) listed below).

Note the 10mm width of the sprocket where it mounts to the splined countershaft.

Front:



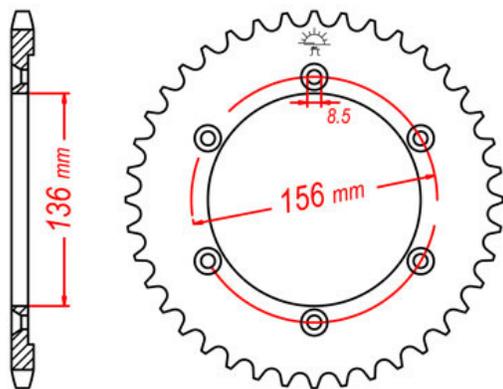
Chain 525

JTF 1448

Material: SCM415 Chromoly Steel Alloy

Available in **14T, 15T**

Rear:



Chain 525

JTR 1791

Material: C49 High Carbon Steel

Available in **41T, 42T, 43T**

JT (JTF1448 and JTR1791) Sprockets from Amazon:

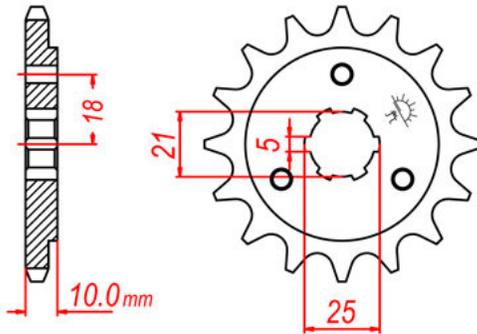
JTF1448 http://www.amazon.com/gp/product/B001AVQJ6C/ref=oh_details_o02_s00_i00

JTR1791 http://www.amazon.com/gp/product/B001AVU2ZQ/ref=oh_details_o02_s00_i01

520 Options:

Alternately (as recommended by ProCycle.us):

Front:



Chain 520

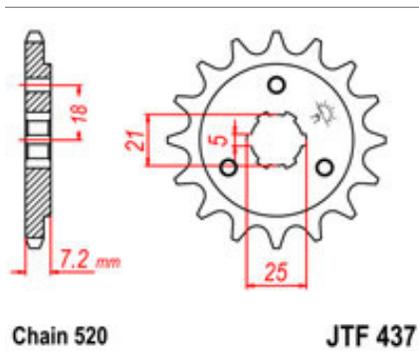
JTF 438

Material: SCM415 Chromoly Steel Alloy

Available in **14T, 15T**

Quote from Procycle.us on the JTF438: "Hard to find front sprocket from the DR750 and DR800. It fits right on all years of DR650. Sprocket is for 520 chain but has a wider hub for deeper engagement with the countershaft splines".

Compare this with the JTF437 which has a 7,2 mm wide hub and which is NOT recommended).

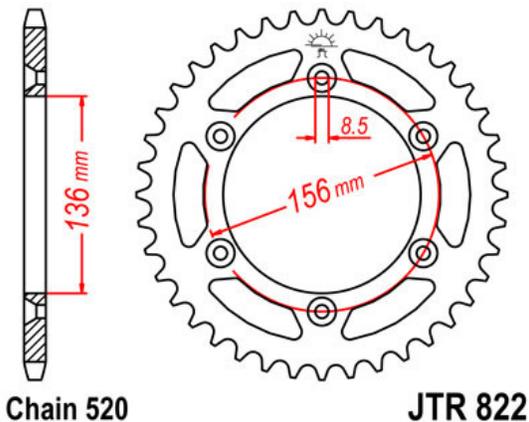


Chain 520

JTF 437

NOT RECOMMENDED

Rear:



Material: C49 High Carbon Steel

Available in **41T thru 53T**

(Note: The rear sprocket from a 94-95 DR350 SE/RS or any year RGV250 will work with the DR650SE with a 520 chain size).

JT Sprockets are available locally from Trickbitz (sales@trickbitz.co.za – Note: Will have to order through your local bike shop; Trickbitz do not sell to the public).

Also available from Amazon.com (Note: Amazon is about half the price from Procycle.us)

JTF438 http://www.amazon.com/gp/product/B00680...00_details

JTR822 http://www.amazon.com/gp/product/B000GT...00_details

Other options: – (Available from www.Keintech.com):

(Sprockets from PBI Sprockets: <http://shop.pbisprockets.com/category.sc?categoryId=10>)

Rear: 6064- DR-650SE 1996-09. 525 Chain.

6064- DR-650SE 1996-09. 525 Chain. Available in **41 through 57** tooth sizes.

Can be ordered in 520 chain size

Material: **Aluminum** 7075-T651.:

Bright Silver Finish.:

Front: 663- DR-650SE 96-09. 525 Chain

663- DR-650SE 96-09. 525 Chain. Available in **12 through 16** tooth.

Material: High Quality Chromoly steel.: Electroless-nickel plating.:

Note: The rear sprocket listed above is Aluminium. Aluminium sprockets offer a weight saving (is this an issue on a DS bike weighing 160kg?), but wear significantly quicker than a steel sprocket, causing the chain to wear too. I personally will not consider an Aluminium sprocket.

Apparently Keintech also supplies 46T and 48T rear sprockets in steel.

Finally, and interesting combination apparently recommended by Vince Strange Motorcycles:
(<http://www.vincestrangmotorcycles.com.au/>)

"I was advised by Vince Strange Motorcycles (here in Oz) who are the DR650 guru's here. to run the 525 chain and C/S sprocket but to go with a 520 rear sprocket... why? I thought... Apparently; it helps clear the mud and sand from the chain a lot more efficiently. So this is what I will do soon." - <http://drriders.com/topic4292-10.html>

I'll probably also go for this option when I replace my OEM chain and sprockets.

Note: It's also possible to select the chain length (14-15-16/46T with a 112 link chain or 14-15-16/48T with a 114 link chain) rear sprocket such that one can change front sprockets from 14T through 16T without removing (or shortening/lengthening) the chain (refer to the article <http://www.advrider.com/forums/showthread.php?t=569034>).