

Disclaimer :

All the information below are conclusions of personal tests in PvP, so it may not be 100% accurate.

However since almost all of it were dmg tests with 100% hitrates, rng had almost no impact on those, so the general idea of every aspect of this doc should be correct, especially the formulas.

But do not make any move that could hurt your build if new things came up or if future updates changed some things talked about here.

For example, **do not sell your boss offhands for now**, get new ultimate offhands with other sources of money (they are cheap anyway).

Do not blame me if you sell your tet nouver/kutum and it becomes better than ultimate offhands in the future.

Something that we didnt know about when i wrote this doc may appear and reduce the strength of special atks.

Also it could very well get nerfed in future updates.

General information confirmed from tests :

-Critical is a 2x multiplier (adds 100% dmg)

-Both down and back atk are a 1.2x multiplier (adds 20% dmg)

-Down/back atk and crit are multiplicative with each other

For example for a down+crit hit, a 2.4x multiplier is applied (adds 140% dmg)

This is important because if it was additive, it would be only 2.2x (adding 120% dmg)

-You can't do a down atk and back atk at the same time (down atk takes the priority when the target is in down status)

-Crit lvl (ie 1 crit gem) is a 5% dmg increase on critical hits

-Crit gems/lvls stack (at least you can get up to 3 crit lvl and each lvl gives 5% dmg)

They are additive so the 2nd crit lvl will have slightly less effect on your dmg than the 1st one, the 3rd one will give even less, but this isnt significant (we are talking about like 0.2% difference here)

-Back/down atk lvl (ie 1 back/down atk gem) is a 8.33% dmg increase on back/down atks (respectively)

-Back/down attack lvls stack (was tested up to 2 but it should work up to 3 like crit)
They are additive like crit too (read above to see what this means)

-Special atk gives you +1 lvl of every modifier (so it gives the effect of every gem, ie crit, back and down atk gems)

Air atk wasn't tested but special atk should add 1 air atk lvl too.

-Special evasion gems seem to give you around 12% chance to immune all skill modifiers on every hit per gem, instead of the supposed 10% by the description

This means that with 2 gems in your chest you have around 24% chance instead of the supposed 20%.

However special evasion only works on skill modifiers, the base dmg still hits and cc too.
Besides, special evasion will immune all skill modifiers or none.

So if it works on a back atk+crit hit, both the back atk and the crit will be immuned.

-Jungle Hamburg food seems to work like 0.5 crit gem.

So it's around a 2-2.5% dmg increase on crits.

-Knight rations ap/human dmg works as intended, gives around 5 ap and 5 human dmg.

-Destruction alch stone ap works as intended (gives around 8 ap at sharp at least, other tiers weren't tested).

Skill modifiers formulas :

The exact formulas for the effect of skill modifiers are :

On crit hits, the dmg formula is :

$$\text{dmg dealt} = (2 + 0.1 * (\text{crit lvl})) * 100 \%$$

On back/down atk, the formula is :

$$\text{dmg dealt} = (1.2 + 0.1 * (\text{down or back atk lvl})) * 100 \%$$

And since crit and back/down atk are multiplicative with each other :

On back/down atk+crit, the formula is :

$$\text{dmg dealt} = (2 + 0.1 * (\text{crit lvl})) * (1.2 + 0.1 * (\text{down or back atk lvl})) * 100 \%$$

-What this formula means is that :

On crit only hits, special atk adds 5% dmg (just like 1 crit gem)

On back/down atk only hits, special atk adds 8.33% dmg (like 1 back/down atk gem)

On back/down atk + crit hits, special atk adds 13.75% dmg (like 1 crit gem + 1 down/back atk gem)

Impact on offhand gem choice :

Crit gems give you 4.6 to 5% more dmg on critical hits while back/down atk gems give you 7.1 to 8.33% more dmg on back/down atk hits (respectively).

However even if you're doing crit/back/down atk hits, special evasion gems will make your targets avoid up to 24% of those special atks if they have 2 gems. This means that on that 24% of hits, your crit/down/back gems won't help.

So on targets with 2 special evasion gems crit gems give you an average 3.5 to 3.8% more dmg on critical hits, while back/down atk gems give you an average 5.4 to 6.33% more dmg on back/down atk hits (respectively).

The range of % dmg increase is due to the fact that those gems are additive, so if the gem you add is your 1st lvl of this specific type of dmg, you will get the highest % said above, if it's your 3rd lvl however, you will get the lowest % said above.

All of this means that if you want the most dmg gain possible, you need to choose between down and back atk gems. If you want a good dmg gain in any situation (as long as you crit), you can use crit gems.

Most people use black/awakened spirit gems, but crit/back/down atk gems do more dmg at high ap on their respective hits than what the 5 ap from spirit gems gives.

So if you're willing to drop the hp from spirit gems, you can get some dmg gain by using crit or back/down atk gems instead.

Impact on offhand weapon choice :

On everything below concerning offhand weapons, i suppose that your targets are running 2 special evasion gems and around 150 DR (full tet boss armor), which is the case of most people currently.

Ultimate offhands are even better if your targets aren't running special evasion gems. However ultimate offhands also lose in strength a bit if your targets have more DR from other sources, but this is very rare in the current meta.

Nouver and Kutum don't have the special atk effect.

All ultimate offhands have the special atk effect.

This means that ultimate offhands are way more efficient for dmg than they seem to be from their ap, when they are used on crit, back and down attack skills.

At 200 ap, the 13.75% dmg increase from special atk on back/down atk + crit hits is effectively worth around 13 ap in average (accounting special evasion gems).

The dmg gain from special atk even increases with the more ap you have, for example this 13.75% dmg increase is worth around 18 ap at 250 ap in average.

This means that when you compare 2 offhands, you need to take into account the worth of the special attack effect.

For example, at the same enchant lvl a steel dagger has 5 less ap than a nouver dagger, and only 1 gem slot, so nouver seems way better. But if you add in the worth of special atk, steel dagger does more dmg than nouver.

For instance, at 250 ap with nouver and 245 ap with steel, a steel dagger with a crit gem is worth about 7 more ap than a nouver with 2 crit gems on back/down atk + crit hits.

If you are doing most of your dmg on either back atk + crit or down atk + crit, then using an ultimate offhand adds in a good amount of dmg compared to what you would expect from the offhand's base ap.

In the end there is almost no reason to use nouver or kutum over an ultimate offhand.

The only classes where a nouver can be decent for pure dmg are warrior, valk, dk and zerk because they don't have any good ap offhand unlike other classes.

But even for those classes, rosar or vangertz/saiyer are more interesting overall.

What offhand you should be using (assuming you do mostly back/down atk + crit hits) :

For survivability : Ultimate Rosar

With the same gems on, rosar does only slightly less dmg than nouver, but you get a lot of evasion and a good amount of dr.

Rosar also does more dmg than kutum, gives a lot more evasion, and almost the same amount of dr.

For dmg : Ultimate Ap/Accuracy offhand

If you want the highest dmg output possible and you play a class with a good ap offhand (aka all classes except zerk, dk, warrior and valk), switch to an ultimate ap offhand, even using a tri ultimate over tet nouver is more dmg.

If you feel like lacking accuracy, you can switch to an accuracy offhand, you don't lose much dmg compared to a nouver anyway, and you get a good amount of accuracy (no data on that, for now at least).

How to calculate the effective ap of your offhand :

The effective ap of an offhand is different for every type of dmg.

For example, the effective ap on crit only hits isn't the same as on back atk only hits.

So if you wanna know the worth of your offhand on all situations, you need to calculate the effective ap on the different types of dmg that you want to know.

The formula is essentially this :

Effective ap = (offhand average ap) + (ap from spirit gems) + (your total ap with this offhand on - (target's dr)/2)*(specific multiplier)*(1 - 0.12*(nb of special evasion gems))

The specific multiplier on this formula is what you need to calculate based on your gems and if your offhand has special attack on it.

Also, as always, a typical dr amount in the current meta is around 150.

To calculate this multiplier you need to use those formulas :

On crit hits, the formula is :

specific multiplier = $1 - (2 + 0.1 * (\text{crit lvl})) / 2$

On back/down atk, the formula is :

specific multiplier = $1 - (1.2 + 0.1 * (\text{down or back atk lvl})) / 1.2$

And since crit and back/down atk are multiplicative with each other :

On back/down atk+crit, the formula is :

specific multiplier = $1 - (2 + 0.1 * (\text{crit lvl})) * (1.2 + 0.1 * (\text{down or back atk lvl})) / 2.4$

I dont have any formula for air attack, but they dont affect most of your dmg anyway.

Examples on crit only :

- special atk with no crit gems :

specific multiplier = $1 - 2.1 / 2 = 1 - 1.05 = 0.05$

- special atk with 1 crit gem :

specific multiplier = $1 - 2.2 / 2 = 1 - 1.1 = 0.1$

Examples on down+crit :

- 2 crit gems :

$$\text{specific multiplier} = 1 - 2.2 * 1.2 / 2.4 = 1 - 1.1 = 0.1$$

- special atk with no crit/down atk gems :

$$\text{specific multiplier} = 1 - 2.1 * 1.3 / 2.4 = 1 - 1.1375 = 0.1375$$

- special atk with 1 crit gem :

$$\text{specific multiplier} = 1 - 2.2 * 1.3 / 2.4 = 1 - 1.192 = 0.192$$

- special atk with 2 crit gems :

$$\text{specific multiplier} = 1 - 2.3 * 1.3 / 2.4 = 1 - 1.246 = 0.246$$

- special atk with 2 down atk gems :

$$\text{specific multiplier} = 1 - 2.1 * 1.5 / 2.4 = 1 - 1.3125 = 0.3125$$

Elixirs :

Bonus dmg elixirs like detection, assassination and carnage work like dmg type gems/lvls.

Green versions are worth 1 gem/lvl.

Blue versions are worth 1.5 gem/lvl.

For example a sharp detection works like 1.5 crit gem/lvl (so adds 6% to 7.5% dmg to your critical hits depending on how many crit gems/lvls you already have).

A brutal carnage works like 1.5 down atk gem/lvl (so adds 10% to 11.7% dmg to your down atk hits depending on how many down atk gems/lvls you already have).

+Defense ignore/nullifying elixirs like death and penetration seem to add flat dmg to all your critical or back atk hits (respectively), no matter what the dp/dr of your opponent is.

Green versions add 5 dmg per hit.

Blue versions add 10 dmg per hit.

For example a brutal death should add 10 dmg to all your crit hits. So if you do 30 hits on someone, the elixir would have done 300 more dmg.

For all 5 of those elixirs, blue versions only were tested, but according to descriptions and how other elixirs work, the green versions should work as explained above.

There is no down attack equivalent to death/penetration in the game, at least in this current build.

Fury elixirs were quickly tested and it seems like they work, but don't give as much ap as they say. A blue fury elixir was only about 2% more dmg at 235 ap, which is far from 15 ap.

Special evasion :

As said above, special evasion gems seem to give you around 12% chance to immune all skill modifiers on every hit per gem, instead of the supposed 10% by the description. So with 2 gems in your chest you have around 24% chance instead of the supposed 20%. However special evasion only works on skill modifiers, the base dmg still hits and cc too.

How effective it actually is :

Against someone using nouver/kutum with no back/down/crit gems:

1 special evasion gem is a 6% average dmg decrease on crit only hits.

1 special evasion gem is a 7% average dmg decrease on back/down+crit hits.

Against someone using an ultimate offhand and/or back/down/crit gems, the dmg decrease becomes slightly more important the more gems/lvls they have.

They are additive so 2 special evasion gems should be at least a 12% average dmg decrease on crit only hits, and 14% on back/down atk + crit hits.

In comparison the other decent chest gem currently is back magic cobelinus which can give you 100 hp + 2 dr.

100 hp is around a 3.5% hp increase and 2 dr should be around a 1.5% dr increase.

This is small compared to the 6-7% numbers of special evasion gems.

However new kamasyvia cobelinus gems may be better than special evasion gems once we get them.

Notes : I have data to back up everything said here, even the formulas.

If you have any questions, pm me (Romanx) on discord, or ask in the theorycraft channel.

Useful link :

[Datamined dp/evasion/dr on offhands \(to compare offhands defense wise\)](#)