



This document serves as a resource for calculating the damage numbers for all 4 of the Vault Hunters inside of Borderlands 3! These general-use formulas were put together with the help and information from quite a few stand-out individuals who tested and confirmed how all of these separate characters and items work! If you have any questions about the formulas below or how to use them please contact SSpyR in the Official Borderlands Discord! Make sure to check out the resources and users that allowed this to happen!

Document Maintained by sspyr, prismatic and cz47 from the Official Borderlands Discord

Thank you to DrStrangeLove on the GBXForums for the Critical Hit Calculations and Sticky Formulas

Thank you to Skwuruhl and CZ on the GBXForums for the Amara Damage Explanation

Thank you to Demonite on Youtube for the FL4K Numbers Explanation

Thank you to jafortune on the GBXForums for the Math Behind Fade Away

Thank you to Prismatic on the GBXForums for the Moze Damage Explanation

Thank you to PlayMyTrapCard from the Official BL Discord for the Moze Ammo Equation

Thank you to Melting_NT from the Official BL Discord for the Playing Dirty Equation

Thank you to HurdyGurdy on the GBXForums for the Splash Damage and Splash Anointment List

Thank you to Stone_swan from the Official BL Discord for the Our Man Flynt Equations

Basic Formula:

*(Base Damage of Gun) * (Gun Damage) * (V1) * (V2) * (Splash Damage) * (Elemental Damage)*

[Demonite Video Explaining This \(Using FL4K\)](#)

The * 2 and onwards with each VH's formula is Crit Damage, remove that portion if you want to calculate without Crit Damage. (If you want exact numbers, keep the Guardian Rank Gun Damage and C-C-Combo Bonus Portion of the Formula)

If not testing for any specific gun, then set Gun Card Damage = 1

V1 and V2 are different Versions/Variants of Flat Damage Increases (“+30% Damage” for example), Whether something is V1 or V2 can change based on source to source but generally V1 is something that relies on you (Power Inside, using AS and being above 50% health for more Damage) while V2 is something that relies on an enemy (Ice Breaker, doing more Damage against Frozen Targets)

%BonusElement is the percentage of your Base Damage on the gun equal to that of the source of the Bonus Element (a 526 Maggie with 50% Bonus Element would use 263 as its %BonusElement for the Bonus Element formula)

The initial 2% of C-C-Combo Bonus is still applied even if only 1 shot is fired, make sure to account for this

If working with a weapon that contains more than one pellet (or when accounting for a possible extra pellet), only enter the base number not multiplied by number of pellets into the Base Damage section. To account for extra pellets, multiply your final result by however many pellets are present.

Code:

Base Damage = Blue

Gun Damage = Red

V1 = Green

V2 = Orange

Splash = Pink

Elemental = Cyan

Crit = Yellow

Misc = Gray

Melee = Dark Green

Notes:

Manufacturer **Gun** Damage is Additive with **Gun** Damage. This includes the Gun Damage given from the Company Man Artifact.

The While Sliding and While Airborne Anointments may or may not be additive with each other but since you cannot have them both at the same time I just put them both in the same section.

If it states +/- Weapon Damage or Gun Damage, it goes into the Gun Damage category of the formula

Torgue Sticky Impact Formula: $NormalDamage * 0.07$

Torgue Sticky Explosion Formula: $NormalDamage * 0.70 * (1 + Sticky Bonus * (N-1))$

N Being Number of Projectiles

NormalDamage would be the VH Formula

It's Piss, Execute, and Eruption's Debuff Effects are all added in 1 category unique to debuff gear.

Amp Damage is in its Own Category, Multiply it in at the End

Multiple Zane Barriers are Multiplicative with Each Other, so all separate categories

CDR Formula: $[\text{Original Cooldown Time} / (1 + \text{Cooldown Rate Bonuses})]$

Movespeed Damage Scaling Formula: (Thanks to Prismatic & Lonemasterino)

Movement Speed Scaling Over Base = $[(1 + \text{Run Speed}(0.532)/\text{Slide Speed}(0.6875)) \times (1 + \text{Violent Speed} + \text{Supersonic Man} + \text{Mindfulness} + \text{Vigor} + \text{Infiltrator}(0.15) + \text{Speed Demon} + \text{Science Movespeed Drug} + \text{Fleet} + \text{Vagabond}) \times (1 + \text{Artifact Stat Speed} + \text{Berserker} + \text{Victory Rush} + \text{SNTL MS})] - 1$

Bonus Resources:

Amara Builds Compendium: <https://bit.ly/AmaraBuilds>

FL4K Builds Compendium: <https://bit.ly/FL4Builds>

Moze Builds Compendium: <https://tinyurl.com/MozeBuilds>

Zane Builds Compendium: <https://bit.ly/ZaneBuilds>

Amara Formula:

$$\begin{aligned} &[(\text{Gun Card Damage}) * (1 + \text{Wrath} + \text{Dread} + \text{Samsara} + \text{Go With The Flow} \\ &+ \text{Driver Damage} + \text{Death's Blessing} + \text{Jab Cross} + \text{Phasezerker} + \text{Com} \\ &\text{Generic Wep Boost} + \text{GunDmgAnoint}) * (1 + \text{C-C-Combo Bonus} + \text{Victory} \\ &\text{Rush} + \text{Terror Damage/ROF Anoint}) * (1 + \text{Laid Bare} + \text{Harmageddon}) * (1 \\ &+ \text{Personal Space} + \text{Com Type Boost} + \text{Artifact Type Boost} + 25\% \text{ on} \\ &\text{Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \text{Arms Deal} + \text{Heavy Rain} + \text{Class} \\ &\text{Mod Splash Damage} + \text{Artifact AOE Damage} + \text{Splash Damage} \\ &\text{Anointment}) * (1 + \text{While-Sliding Damage Anoint} + \text{While-Airborne Damage} \\ &\text{Anoint}) * (1 + \text{Tempest} + \text{Tempest Shock} + \text{Artifact Elemental} + \text{Burn Both} \\ &\text{Ends})] * 2 * [(1 + \text{SniperBonus}) * (1 + \text{WeaponCritBonus}) * (1 + \\ &\text{ManufacturerBonus}) * (1 + \text{Transcend} + \text{ClassMod} + \text{GuardRank} + \\ &\text{Anointment})] * [(1 + \text{Guardian Rank Gun Damage})] \end{aligned}$$

-Bonus Element (do this for each bonus element)

$$\begin{aligned} &[(\% \text{BonusElement}) * (1 + \text{Wrath} + \text{Dread} + \text{Samsara} + \text{Go With The} \\ &\text{Flow} + \text{Driver Base} + \text{Driver Scaled} + \text{Death's Blessing} + \text{Jab Cross} + \\ &\text{Phasezerker} + \text{Com Generic Wep Boost} + \text{GunDmgAnoint}) * (1 + \\ &\text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Terror Damage/ROF Anoint}) * (1 \\ &+ \text{Laid Bare} + \text{Harmageddon}) * (1 + \text{Personal Space} + \text{Com Type} \\ &\text{Boost} + \text{Artifact Type Boost} + 25\% \text{ on Grenade Throw} + 150/90 \\ &\text{Anoint}) * (1 + \text{While-Sliding Damage Anoint} + \text{While-Airborne} \\ &\text{Damage Anoint}) * (1 + \text{Tempest} + \text{Tempest Shock} + \text{Artifact} \\ &\text{Elemental} + \text{Burn Both Ends})] * 2 * [(1 + \text{SniperBonus}) * (1 + \\ &\text{WeaponCritBonus}) * (1 + \text{ManufacturerBonus}) * (1 + \text{Transcend} + \\ &\text{ClassMod} + \text{GuardRank} + \text{Anointment})] * [(1 + \text{Guardian Rank Gun} \\ &\text{Damage})] \end{aligned}$$

-COM and Artifact Weapon Type boosts don't apply to Shield and Grenade ASE 50% Bonus Elements

-Driver Note

Driver Damage at Normal speed is 20%.

Scaling with movement speed follows more involved math, for info on this please refer to [this resource](#) and if you still have questions ping @prismatic

This Damage is Applied on Shot

The damage you get for moving is capped at 500% movespeed, so exceeding 500% movespeed is unnecessary.

However, for stickies when you are reloading to proc, slide beforehand

FL4K Formula:

[Gearbox Forums Post on FL4K related Damage Calculations](#)

$$\begin{aligned} &[(\text{Gun Card Damage}) * (1 + \text{Furious Attack} + \text{Turn Tail} + \text{Furryous} + \\ &\text{Persistence Hunter} + \text{Horned Skag Gun Damage} + \text{Dangerous Game} + \\ &\text{Grim Harvest} + \text{Com Generic Wep Boost} + \text{St4ckB0t} + \text{GunDmgAnoint}) * (1 \\ &+ \text{Frenzy} + \text{Empathic Rage} + \text{Pack Tactics} + \text{Skag Damage} + \\ &\text{Interplanetary} + \text{Power Inside} + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Terror} \\ &\text{Damage/ROF Anoint}) * (1 + \text{Hidden Machine} + \text{Hunter's Eye} + \text{DE4DEYE} \\ &\text{Mod} + \text{Rakk Anoint} + \text{Com Type Boost} + \text{Artifact Type Boost} + 25\% \text{ on} \\ &\text{Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \text{Class Mod Splash Damage} + \\ &\text{Artifact AOE Damage} + \text{Splash Damage Anointment}) * (1 + \text{While-Sliding} \\ &\text{Damage Anoint} + \text{While-Airborne Damage Anoint}) * (1 + \text{Harmageddon}) * \\ &[(1 + \text{Interplanetary Stalker Corr bonus}) * (1 + \text{Artifact Elemental} + \\ &\text{Scorcher})] * [(\text{Fade Away/Guerillas in the Mist} + \text{Unblinking Eye} + \text{rakk crit} \\ &\text{anoint}) + (\text{Hunter's Eye Human}) + 2 * [(1 + \text{SniperBonus}) * (1 + \\ &\text{WeaponCritBonus}) * (1 + \text{ManufacturerBonus}) * (1 + \text{Ambush Predator} + \\ &\text{Dangerous Game} + \text{Galactic Shadow} + \text{Gunslinger Jabber} + \text{ClassMod} + \\ &\text{GuardRank} + \text{Anointment})] * [(1 + \text{Guardian Rank Gun Damage})] * (1 + \\ &\text{Monkey Do}) \end{aligned}$$

Monkey Do Warning: Monkey Do converts your guns damage to non elemental. This is usually a damage loss. Secondly Monkey Do always adds 86% damage, whether you invest 1 point or 5. It doesn't change with investment. Furthermore Monkey Do only adds 86% of 1 pellets damage. Hence the more listed pellets your gun has the less Monkey do adds.

-Bonus Element (do this for each bonus element)

$$[(\% \text{BonusElement}) * (1 + \text{Furious Attack} + \text{Turn Tail} + \text{Furryous} + \text{Persistence Hunter} + \text{Horned Skag Gun Damage} + \text{Dangerous Game} + \text{Grim Harvest} + \text{Com Generic Wep Boost} + \text{St4ckB0t} +$$

$$\text{GunDmgAnoint} * (1 + \text{Frenzy} + \text{Empathic Rage} + \text{Pack Tactics} + \text{Skag Damage} + \text{Interplanetary} + \text{Power Inside} + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Terror Damage/ROF Anoint}) * (1 + \text{Hidden Machine} + \text{Hunter's Eye} + \text{DE4DEYE Mod} + \text{Rakk Anoint} + \text{Com Type Boost} + \text{Artifact Type Boos} + 25\% \text{ on Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \text{While-Sliding Damage Anoint} + \text{While-Airborne Damage Anoint}) * [(1 + \text{Interplanetary Stalker Corr bonus}) * (1 + \text{Artifact Elemental} + \text{Scorcher})] * [(\text{Fade Away/Guerillas in the Mist} + \text{Unblinking Eye}) + (\text{Hunter's Eye Human}) + 2 * [(1 + \text{SniperBonus}) * (1 + \text{WeaponCritBonus}) * (1 + \text{ManufacturerBonus}) * (1 + \text{Ambush Predator} + \text{Dangerous Game} + \text{Galactic Shadow} + \text{Gunslinger Jabber} + \text{ClassMod} + \text{GuardRank} + \text{Anointment})] * (1 + \text{Harmageddon}) * [(1 + \text{Guardian Rank Gun Damage})] * (1 + \text{Monkey Do})$$

-COM and Artifact Weapon Type boosts don't apply to Shield and Grenade ASE 50% Bonus Elements

-For a Fade Away Body Shot

$$[(\text{Gun Card Damage}) * (1 + \text{Furious Attack} + \text{Turn Tail} + \text{Furryous} + \text{Persistence Hunter} + \text{Horned Skag Gun Damage} + \text{Dangerous Game} + \text{Grim Harvest} + \text{Com Generic Wep Boost} + \text{St4ckB0t} + \text{GunDmgAnoint}) * (1 + \text{Frenzy} + \text{Empathic Rage} + \text{Pack Tactics} + \text{Skag Damage} + \text{Interplanetary} + \text{Power Inside} + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Terror Damage/ROF Anoint}) * (1 + \text{Hidden Machine} + \text{Hunter's Eye} + \text{DE4DEYE Mod} + \text{Rakk Anoint} + \text{Com Type Boost} + \text{Artifact Type Boost} + 25\% \text{ on Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \text{Class Mod Splash Damage} + \text{Artifact AOE Damage} + \text{Splash Damage Anointment}) * (1 + \text{While-Sliding Damage Anoint} + \text{While-Airborne Damage Anoint}) * (1 + \text{Harmageddon}) * [(1 + \text{Interplanetary Stalker Corr bonus}) * (1 + \text{Artifact Elemental} + \text{Scorcher})] * [(1 + \text{Fade Away/Guerillas in the Mist} + \text{Unblinking Eye})] * [(1 + \text{Guardian Rank Gun Damage})] * (1 + \text{Monkey Do})$$

Moze Formula:

[Gearbox Forums Post on Moze related Damage Calculations](#)

$$\{[(\text{Gun Card Damage}) * (1 + \text{Armored Infantry} + \text{Drowning in Brass} + \text{Desperate Measures} + \text{Phalanx Doctrine} + \text{Tenacious Defense} + \text{Scrappy} + \text{Click, Click} + \text{Harmonious Havoc} + \text{Com Generic Wep Boost} + \text{GunDmgAnoint} + \text{Consec Hits}) * (1 + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Flare} + \text{Terror Damage/ROF Anoint}) * (1 + \text{Target Softening} + \text{Harmageddon}) * (1 + \text{Com Type Boost} + \text{Artifact Type Boost} + 25\% \text{ on Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \text{Torgue Cross Promotion} + \text{Class Mod Splash Damage} + \text{Artifact AOE Damage} + \text{Splash Damage Anointment} + \text{Blastmaster Mod}) * (1 + \text{While-Sliding Damage Anoint} + \text{While-Airborne Damage Anoint}) * (1 + \text{Stoke the Embers} + \text{Artifact Elemental} + \text{Superior Firepower Cryo})] * 2 * [(1 + \text{SniperBonus}) * (1 + \text{WeaponCritBonus}) * (1 + \text{ManufacturerBonus}) * (1 + \text{Scorching RPM's} + \text{ClassMod} + \text{GuardRank} + \text{Anointment})] * [(1 + \text{Guardian Rank Gun Damage})]\}$$

-Add This After For Bonus Incendiary

+
$$\{[(\text{\%BonusElement}) * (1 + \text{Armored Infantry} + \text{Drowning in Brass} + \text{Desperate Measures} + \text{Phalanx Doctrine} + \text{Tenacious Defense} + \text{Scrappy} + \text{Click, Click} + \text{Harmonious Havoc} + \text{Com Generic Wep Boost} + \text{GunDmgAnoint} + \text{Consec Hits}) * (1 + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Flare} + \text{Terror Damage/ROF Anoint}) * (1 + \text{Target Softening} + \text{Harmageddon}) * (1 + \text{Com Type Boost} + \text{Artifact Type Boost} + 25\% \text{ on Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \text{While-Sliding Damage Anoint} + \text{While-Airborne Damage Anoint})] * 2 * [(1 + \text{SniperBonus}) * (1 + \text{WeaponCritBonus}) * (1 +$$

$$\text{ManufacturerBonus}) * (1 + \text{Scorching RPM's} + \text{ClassMod} + \text{GuardRank} + \text{Anointment}) * [(1 + \text{Guardian Rank Gun Damage})] * [((\text{Selfless Vengeance} + \text{Experimental Munitions} + \text{Cloud of Lead} + \% \text{BonusIncendiaryAnoint}) + ((\text{Gun Card Damage} * \text{Gun Damage bonuses}) * (\text{Fire in The Skag Den})) * (1 + \text{Stoke the Embers} + \text{Artifact Incendiary})]$$

-COM and Artifact Weapon Type boosts don't apply to Shield, Grenade and FitsD Bonus Elements

-For Short Fuse Add:

$$+ \{[(\text{Regular Formula})] * [(\text{ShortFuseDMG}\%)] * (1 + \text{Torgue Cross Promotion} + \text{Class Mod Splash Damage} + \text{Artifact AOE Damage} + \text{Splash Damage Anointment} + \text{Blastmaster Mod}) * (\text{Mayhem Level Damage Scaler}) * (1 + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Flare} + \text{Terror Damage/ROF Anoint}) * (1 + 25\% \text{ on Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \text{Target Softening} + \text{Harmageddon}) * \text{Kinetic Multiplier}\}$$

$$+ \{[(\text{ShortFuseDMG}\%)] * [(\text{Regular Formula})] * (1 + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Flare} + \text{Terror Damage/ROF Anoint}) * (1 + 25\% \text{ on Grenade Throw} + 150/90 \text{ Anoint}) * [(\text{Fire in the Skag Den})] * [(1 + \text{Stoke the Embers} + \text{Artifact Incendiary})]\}$$

-Mayhem Level Damage Scaler is 5.5x for Short Fuse at Mayhem 10 and 11. Skag Den and Iron Bear use 31x for the Mayhem Level Damage Scaler

-Currently Superior Firepower grants Moze a stacking bonus of 20% cryo damage up to 100%.

-Moze Ammo Equation

(Gun Mag Size) * (1 + Mag Size Modifiers) * (Redis/Forge %) - (Gun Fire Rate * (1 + Fire Rate%) * (1 - Cloud of Lead Chance) * (# of Ammo Consumed))

example with:

kyb's worth with 44 mag size, 40% mag from relic, 2 redis = 10% regen, 7.88 fire rate, 5/5 cloud of lead

*$(44) * (1 + .4) * (.1) - (7.88 * (1 - 1/4)) = 6.16 - 5.91 = .25$ ammo/second regen while firing*

Zane Formula:

[Picture of Commitment as there are no GBX Forums Zane Damage Formula posts](#)

$$\begin{aligned} &[(\text{Gun Card Damage}) * (1 + \text{Commitment} + \text{Art of War} + \text{Confident} \\ &\text{Competence} + \text{Violent Momentum Damage} + \text{Donnybrook} + \text{Synchronicity} \\ &+ \text{Double Barrel} + \text{Infiltrator Mod} + \text{Antifreeze Mod} + \text{Retaliation} + \text{Com} \\ &\text{Generic Wep Boost} + \text{GunDmgAnoint}) * (1 + \text{C-C-Combo Bonus} + \text{Victory} \\ &\text{Rush} + \text{Terror Damage/ROF Anoint}) * (1 + \text{Barrier Amp}) * (1 + \text{No Way Out} \\ &+ \text{Harmageddon}) * (1 + \text{Our Man Flynt} + \text{Icebreaker} + \text{Artifact Type Boost} + \\ &\text{COM Type Boost} + 25\% \text{ on Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \text{Class} \\ &\text{Mod Splash Damage} + \text{Artifact AOE Damage} + \text{Splash Damage} \\ &\text{Anointment}) * (1 + \text{While-Sliding Damage Anoint} + \text{While-Airborne Damage} \\ &\text{Anoint}) * (1 + \text{Executor Cryo} + \text{Artifact Elemental})] * [\text{Hustler Crit}] + 2 * [(1 + \\ &\text{SniperBonus}) * (1 + \text{WeaponCritBonus}) * (1 + \text{ManufacturerBonus}) * (1 + \\ &\text{Headsman's Hand} + \text{Executor Mod} + \text{ClassMod} + \text{GuardRank} + \\ &\text{Anointment})] * [(1 + \text{Guardian Rank Gun Damage})] \end{aligned}$$

-Bonus Element (do this for each bonus element)

$$\begin{aligned} &[(\% \text{BonusElement}) * (1 + \text{Commitment} + \text{Art of War} + \text{Confident} \\ &\text{Competence} + \text{Violent Momentum Base} + \text{Violent Momentum Scaled} \\ &+ \text{Donnybrook} + \text{Synchronicity} + \text{Double Barrel} + \text{Infiltrator Mod} + \\ &\text{Antifreeze Mod} + \text{Retaliation} + \text{Com Generic Wep Boost} + \\ &\text{GunDmgAnoint}) * (1 + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Terror} \\ &\text{Damage/ROF Anoint}) * (1 + \text{Barrier Amp}) * (1 + \text{Harmageddon} + \text{No} \\ &\text{Way Out}) * (1 + \text{Our Man Flynt} + \text{Icebreaker} + \text{Com Type Boost} + \\ &\text{Artifact Type Boos} + 25\% \text{ on Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \\ &\text{While-Sliding Damage Anoint} + \text{While-Airborne Damage Anoint}) * (1 \\ &+ \text{Executor Cryo} + \text{Artifact Elemental})] * [\text{Hustler Crit}] + 2 * [(1 + \\ &\text{SniperBonus}) * (1 + \text{WeaponCritBonus}) * (1 + \text{ManufacturerBonus}) * \\ &(1 + \text{Headsman's Hand} + \text{Executor Mod} + \text{ClassMod} + \text{GuardRank} + \end{aligned}$$

$\text{Anointment}] * [(1 + \text{Guardian Rank Gun Damage})]$

-COM and Artifact Weapon Type boosts don't apply to Shield and Grenade ASE 50% Bonus Elements

-For New Eraser Projectiles:

$[(\text{Impact Damage}) * (\text{EraserDMG}\%) * (1 + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Terror Damage/ROF Anoint}) * (1 + \text{Barrier Amp}) * (1 + \text{Harmageddon} + \text{No Way Out}) * (1 + \text{Our Man Flynt} + \text{Icebreaker} + \text{Artifact Type Boost} + \text{COM Type Boost} + \text{Artifact Type Boost} + 25\% \text{ on Grenade Throw} + 150/90 \text{ Anoint}) * (1 + \text{Class Mod Splash Damage} + \text{Artifact AOE Damage} + \text{Splash Damage Anointment}) * (1 + \text{Executor Cryo} + \text{Artifact Elemental})] * [\text{Hustler Crit}] + 2 * [(1 + \text{SniperBonus}) * (1 + \text{WeaponCritBonus}) * (1 + \text{ManufacturerBonus}) * (1 + \text{Headsman's Hand} + \text{Executor Mod} + \text{ClassMod} + \text{GuardRank} + \text{Anointment})]$

-Currently the Executor COM grants Zane 20% cryo damage at base as a kill skill. Seein' Red and Death Follows Close boost this upto 28%.

-Violent Momentum Note

5/5 Violent Momentum Damage at Normal speed is 20%. This scales multiplicatively with Kill Skill Bonuses, including 15% from Seeing Red, 25% from Death Follows Close, and 10% from Seein' Dead and Spy Class Mods. Kill Skill Bonuses are additive with each other.

Scaling with movement speed follows more involved math, for info on this please refer to [this resource](#) and if you still have questions ping @prismatic or JoeForLong#7699

This Damage is Applied on Shot

The damage you get for moving is capped at 500% movespeed, so exceeding 500% movespeed is unnecessary.

However, for stickies when you are reloading to proc, slide beforehand

-Playing Dirty Equation

*Reproc Chance: $(PD\ Chance) * (1 - ((1 - 0.04)^{(5 * (Pellet\ Count + 1))}))$*

Effective damage up: $(1/Pellet\ Count)$

This equation works for guns that are consistent with hits and pellets across the board

Our Man Flynt:

Gun Impact Damage:

$0.2 * (\text{Card Damage}) * \text{Gun Damage} * \text{GR Gun Damage} * \text{Pearl Mult} * \text{Critical} * \text{Elemental Damage} * V1 * V2 (\text{Including OMF}) * \text{Splash Damage} * \text{Debuffs} * \text{Elemental Matchup}$

MNTIS Impact Damage:

$0.2 * 31 * (\text{MNTIS base damage}) * \text{Action Skill Damage} * \text{Proliferation} * \text{Crit} (\text{Inclusive of your gun crit mult}) * \text{Elemental Damage} * V1 * V2 (\text{Excluding Gun only v2}) * \text{Splash Damage} * \text{Debuffs} * \text{Elemental Matchup}$

Dot Formula:

- Same for Mntis and Gun triggered OMF dots:

$\text{Impact Damage} * \text{Elemental Damage} * V1 * V2 (\text{Excluding Gun only v2}) * \text{Debuffs} * \text{status dmg} * \text{Elemental Matchup}$

- Base mantis damage is 25994 at level 72.
- The element is based on the Weapon card of the gun you are holding or the MNTIS Cannon element.

Grenade Formula:

$$\begin{aligned} & (\text{Grenade Card Damage}) * [(1 + \text{Artifact Grenade Damage} + \text{GR Grenade Damage}) * (1 + \text{MoreThanOkayBoomer}) + \text{COM Grenade Damage}] * (1 + \\ & \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Terror Damage/ROF Anoint} + \\ & \text{Character V1}) * (1 + \text{ASA 150\% Grenade Anoint} + 25\% \text{ on Grenade Throw} \\ & + 150/90 \text{ Anoint} + \text{Guardian 4N631} + \text{Character V2}) * (1 + \text{Class Mod} \\ & \text{Splash Damage} + \text{Artifact AOE Damage} + \text{Splash Damage Anointment} + \\ & \text{Character Splash}) * (1 + \text{Harmageddon} + \text{Character Debuff}) * (1 + \text{Artifact} \\ & \text{Elemental Damage} + \text{Guardian Rank Elemental Damage} + \text{Character} \\ & \text{Elemental Damage}) * 2 * [(1 + \text{SniperBonus}) * (1 + \text{WeaponCritBonus}) * (1 \\ & + \text{ManufacturerBonus}) * (1 + \text{ClassMod} + \text{GuardRank} + \text{Crit Anointment} + \\ & \text{Character Crit})] \end{aligned}$$

-For “Character V1/V2/Splash/Debuff/Elemental/Crit”: check in the Vault Hunter specific formulas above for VH specific bonuses that go into these categories.

-Gun only V2 like ‘Personal Space’, ‘Our Man Flynt’ and COM/Artifact type boosts don’t increase grenade damage.

-Not all Grenades can naturally crit. Some only crit after the initial impact after which the child projectiles can. Examples: skulls spawned by the Ghast Call and child grenades from Lightspeed.

-Moze can make all grenades crit through “Pull the Holy Pin”, however crits caused by this skill do not benefit from any crit bonuses.

-Currently Grenade Damage on Artifacts displays an incorrect value. The actual value is the same you’d see next to AOE rolls on Artifacts, i.e. 55% at lvl72.

-Special grenades

-Hunter seekers while airborne don't deal grenade damage. Instead, they shoot bullets that can make use of gun related skills/effects like Short Fuse, Megavore, Kensei etc. Hunter Seekers don't benefit from gun damage boosts. When landing and exploding on impact, they do get the formula above.

-EMP's special effect also counts as a bullet and can make use of gun related skills like Hunter seekers do.

-Fish Slap does not deal or benefit from grenade damage, instead this grenade mod deals and benefits from melee damage and is able to make use of melee related skills and gear.

-Sticky grenades are among the strongest grenades in the game. This is due to the fact that they double dip the grenade formula. To calculate total damage dealt by these grenades:

$$[\text{grenade formula}] * [1 + ((\text{sticky mult}) * (\text{grenade formula without splash, OGT25\% and ASA150\%}))]$$

(sticky mult): -1 sticky part: 0.25
-2 sticky parts: 1
-3 sticky parts: 2

-Tediore Reloads

$$\begin{aligned}
 & (\text{Gun Card Damage}) * (1 + \text{Gun Damage Bonuses}) * [(1 + \text{Artifact} \\
 & \text{Grenade Damage} + \text{GR Grenade Damage}) * (1 + \\
 & \text{MoreThanOkayBoomer}) + \text{COM Grenade Damage}] * (1 + \\
 & \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Terror Damage/ROF Anoint} + \\
 & \text{Character V1}) * (1 + \text{ASA 150\% Grenade Anoint} + 25\% \text{ on Grenade} \\
 & \text{Throw} + 150/90 \text{ Anoint} + \text{Character V2}) * (1 + \text{Class Mod Splash} \\
 & \text{Damage} + \text{Artifact AOE Damage} + \text{Splash Damage Anointment} + \\
 & \text{Character Splash}) * (1 + \text{Harmageddon} + \text{Character Debuff}) * (1 + \\
 & \text{Artifact Elemental Damage} + \text{Guardian Rank Elemental Damage} + \\
 & \text{Character Elemental Damage}) * (\text{Bullets Left in Magazine}) * (\text{Misc}) * \\
 & 2 * [(1 + \text{WeaponCritBonus}) * (1 + \text{ManufacturerBonus}) * (1 + \\
 & \text{ClassMod} + \text{GuardRank} + \text{Crit Anointment} + \text{Character Crit})]
 \end{aligned}$$

Important Notes:

- **Gun Damage** is calculated when you throw the Tediore. Everything else is calculated when the Tediore impacts a surface or enemy.
- For **Bullets Left in Magazine**, take the amount of bullets you have when you reload the gun and divide it by 2 (rounding down). 3 is the minimum this number goes for calculation purposes (at 7 bullets in the magazine).
- Tediore Pistols and SMG's with X2 parts do not have that second pellet accounted for for their card damage, effectively dealing 50% damage.
- Multi-pellet Tediore Shotguns deal roughly 43% of their total card damage in regards to their reloads. We do not know why.
 - Alien Barrel Tediore shotguns do not abide by this rule due to their single-pellet nature.
- The Erratic Barrel ("Shoots until empty") on Tediore SMG's, Pistols, and Shotguns decreases chuck damage by 25%. The Leg Module decreases the chuck damage of Pistols and Shotguns by 25%, **but not SMG's**. These reductions stack for 43% decreased chuck damage.

- Tediore MIRV's each deal 50% of the damage of the initial reload explosion.
- Tediore Target Barrel deals an extra 50% reload damage upon detonation of the target orb.
- Unique Tediore's may deal more or less chuck damage, varying from Unique to Unique. [All Unique chuck-modifiers are listed here.](#)

Melee Formula:

-Pure Melee

$$(18 * 1.09^{\text{level}}) * (\text{Mayhemscaling Melee}) * (\text{BlitzMult}) * (1 + \text{Weapon Blade} + \text{Shield Roid Bonus} + \text{COM Melee Bonus} + \text{Artifact Melee Bonus} + 100\% \text{MeleeAnoint} + \text{GR Melee Damage} + \text{Character Melee}) * (\text{Psychostabber} / \text{Buttplug}) * (1 + \text{Harmageddon} + \text{Character Debuff}) * (1 + \text{Victory Rush} + \text{Terror Damage/ROF Anoint} + \text{Character V1}) * (1 + 150/90 \text{Anoint} + \text{Ice Breaker} + \text{Stinger at Full} + \text{Character V2}) * (\text{Buttplug from behind}) * (1 + \text{Artifact Elemental Damage} + \text{GR Elemental Damage} + \text{Character Elemental Damage}) * (1 + \text{Frozen MeleeBonus} 200\%)$$

-BlitzMult (only for Amara!) = $0.75 + 0.015 * \text{level}$

-For “Character V1/V2/Debuff/Elemental”: check in the Vault Hunter specific formulas above for VH specific bonuses that go into these categories.

-For “Character Melee”, only Amara has melee bonuses in her trees. These are the following: Find Your Center + Blitz100% + Illuminated Fist + Joyful Freedom + No Mistakes In Nature + 200% MeleeAnoint

-Gun only V2 like ‘Personal Space’, ‘Our Man Flynt’ and COM/Artifact type boosts don’t increase Melee damage.

-Face-puncher

$$(\text{Card Damage}) * (\text{Mayhemscaling Melee}) * (1 + \text{Com Generic Wep Boost} + \text{GunDmgAnoint} + \text{Character Weapon Damage}) * (1 + \text{C-C-Combo Bonus} + \text{Victory Rush} + \text{Terror Damage/ROF Anoint} + \text{Character V1}) * (1 + 150/90 \text{Anoint} + \text{Ice Breaker} + \text{Stinger at Full} + \text{Character V2}) * (1 + \text{While-Sliding} / \text{While-Airborne Damage Anoint}) * (1 + \text{Harmageddon} + \text{Character Debuff}) * (1 + \text{Artifact Elemental Damage} + \text{GR Elemental Damage} + \text{Character Elemental}) * (1 + \text{Weapon Blade} + \text{Shield Roid Bonus} + \text{COM Melee Bonus} + \text{Artifact Melee Bonus} + 100\% \text{MeleeAnoint} + \text{GR Melee} + \text{Character Melee}) * (1 + \text{Frozen MeleeBonus}) * (1 + \text{Amp})$$

-Illuminated Fist’s element conversion does not apply to the Face-Puncher, it does provide a 75% melee boost though.

-Special Melee instances

*-**Fish Slap** is a grenade mod that deals Melee Damage instead of Grenade Damage. It gets the same formula as [Pure Melee](#) with the addition of the **Splash** Multiplier on top of it.*

*-**Stinger** is a shield that when full provides a 1.5 Multiplier to all melee dealt (except for Kensei). Additionally as an on-break effect this shield releases a nova that deals melee damage. The formula for that nova is the same as [Pure Melee](#) with the addition of the **Splash** Multiplier on top of it.*

*-**Kensei** is a Class Mod for Amara that on Action Skill Start grants Amara a melee bonus element for 6s. The formula is the same as that of the [Face-puncher](#) with a **0.1** multiplier (10%) and no **Stinger at full** bonus. For more information on how this works click [here](#).*

-Noteworthy interaction between Infusion, melee and Body and Mind when using the Face-puncher. Body and Mind is a skill that triggers a nova when dealing melee; the Face-puncher enhances this effect by being able to deal either x7 or x14 instances of melee per shot. When spending just 1 point into infusion, all melee instances dealt by the Face-puncher are doubled and as a result so are the Body and Mind novas (up to x28 novas). (Thanks Quag!)

Resources used:

[-DocStrangeLov's Melee / Face-puncher formulas and analysis](#)

[-Amara's 4th tree and Kensei formula](#)