2023-01-19 - HP Carbon 1.7.6

Here you can find information about what is new in HP Carbon version 1.7.6.

On this page:

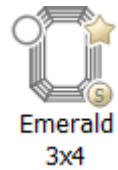## Smart Cuts. SmartRecut for generic parametric cuts

Many users apply the generic parametric cuts for diamond allocation. These cuts have an extensive number of parameters and may provide with high-yield solutions. Asymmetric allocation algorithm 'SmartRecut' could provide with even higher yields to solutions based on the generic parametric cuts. Since current version users can run the SmartRecut algorithm for a solution based on most popular Octonus generic parametric cuts. set of cuts will expand over time. Let's call them "Smart Cuts".

There is a video about Smart Cuts: what is it, why is it useful to work with Smart Cuts, how to operate in software with Smart Cuts to get high yield solutions by Smart Recut.

Video	SmartRecut for generic parametric cuts			
Published:	2022, December 15	**Last Updated:**	2021, December 23	**v.4.2**
Your browser does not support the HTML5 video element				
Video summary:				
• Generic parametric cuts may produce high-yield solutions. • Since current version SmartRecut runs for solutions based on most popular Octonus generic parametric cuts (Smart Cuts). Thereby you get even higher yields. • Smart Cut has its linked appraiser. Operator specify factory cut standards in the unified SmartCut appraiser just once. And get control over the necessary parameters limits at all stages of solutions allocation and appraising. • Smart Cuts are located in Cutbook "Generic Cuts". Smart Cuts are highlighted by badge "S" • Sweetline is available for generic parametric cuts. Sweetline allows you to find solutions with better Optical Performance.				
Video keywords: Smart Cuts, DLL cuts, generic parametric cuts, SmartRecut				
Data	Video_SmartCuts_Princess3S_.ox2z Cutwise project with solutions of Smart Cut (Sweetline ON) Cutwise project with solutions of Smart Cut (Sweetline OFF)			
Published in:	**Release Notes**	2023-01-19 - HP Carbon 1.7.6		
	Documentation	NA		
	Playlists	NA		
	Also	As Separate Page | On YouTube | Specification		

Many users apply the generic parametric cuts for diamond allocation. These cuts have an extensive number of parameters and may provide with high-yield solutions. Asymmetric allocation algorithm 'SmartRecut' could provide with even higher yields to solutions based on the generic parametric cuts. Since current version users can run the SmartRecut algorithm for a solution based on most popular Octonus generic parametric cuts. set of cuts will expand over time. Let's call them "Smart Cuts".
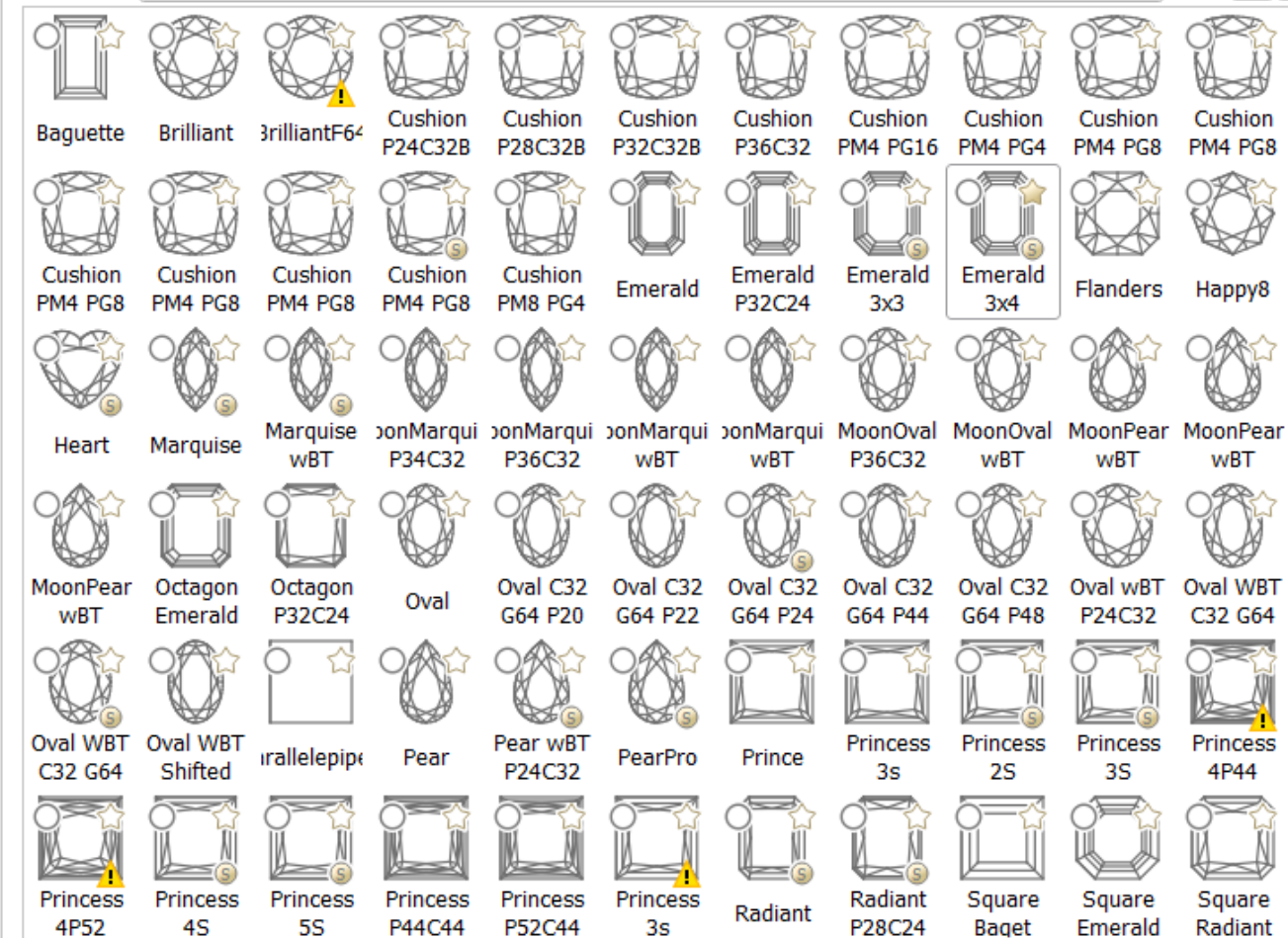
Smart Cuts are located in Cutbook "Generic Cuts". Smart Cuts are highlighted by badge "S" in the lower right corner of the cut. set of Smart Cuts will expand over time.

Emerald
3x4

Diamond Allocation

Algorithm: 22. Single (Recut)

Cutbook: Generic Cuts   0/66

Baguette	Brilliant	BrilliantF64	Cushion P24C32B	Cushion P28C32B	Cushion P32C32B	Cushion P36C32	Cushion PM4 PG16	Cushion PM4 PG4	Cushion PM4 PG8	Cushion PM4 PG8
Cushion PM4 PG8	Cushion PM4 PG8	Cushion PM4 PG8	Cushion PM4 PG8	Cushion PM8 PG4	Emerald	Emerald P32C24	Emerald 3x3	Emerald 3x4	Flanders	Happy8
Heart	Marquise	Marquise wBT	MoonMarqui P34C32	MoonMarqui P36C32	MoonMarqui wBT	MoonMarqui wBT	MoonOval P36C32	MoonOval wBT	MoonPear wBT	MoonPear wBT
MoonPear wBT	Octagon Emerald	Octagon P32C24	Oval	Oval C32 G64 P20	Oval C32 G64 P22	Oval C32 G64 P24	Oval C32 G64 P44	Oval C32 G64 P48	Oval wBT P24C32	Oval WBT C32 G64
Oval WBT C32 G64	Oval WBT Shifted	Parallelepipe	Pear	Pear wBT P24C32	PearPro	Prince	Princess 3s	Princess 2S	Princess 3S	Princess 4P44
Princess 4P52	Princess 4S	Princess 5S	Princess P44C44	Princess P52C44	Princess 3s	Radiant	Radiant P28C24	Square Baget	Square Emerald	Square Radiant

Smart Cut has its linked appraiser which is automatically displayed along with cut selection. There are two types of parameters in the appraiser of Smart Cut: parameters of generic parametric cut and parameters from the new In-house appraiser.

Consider firstly parameters of generic parametric cut. There are first stage of allocation by global algorithms and second stage by SmartRecut algorithm. Global algorithms of allocation vary values of considered parameters for search of optimal solution. But SmartRecut algorithm doesn't use these parameters. Also note that these parameters doesn't participate in final solution grading. An editing the limits of these parameters is available in a user-friendly software interface in the panel appraiser editor. Previously, this operation was laborious, requiring manually edit of the appraiser txt-file.

Secondly consider parameters from the In-house appraisers. SmartRecut algorithm uses only these parameters during it's allocation stage. After getting of solutions the grading is produced by only these parameters. Sometimes solutions of global algorithms may have values of certain parameters that exceed the Excellent boundaries. In most cases SmartRecut will be able to fit these values in the Excellent group.

There is a sample of running of SmartRecut for one of Smart Cut - Radiant P28C24. There are solutions of SmarRecut with high yield and good optical performance:

⚠ **Important! Known issues!**

In the following cases, SmartRecut may not work on SmartCut solutions:

- Heart. Cut is not completed.
- PearPro, Pear_wBT.P24C32. Global algorithms may have mistake in values of CuletOffsetLength more than Relative interval. So Absolute and Relative intervals for SmartRecut are not compatible.
- Princesses (2S, 3S, 4S, 5S). Global algorithms have too big slope angle asymmetry for square Facet Types. It is conflict with SmartRecut parameter Angles_FacetTypesSlopeIdeality. The values of this parameter can be temporarily increased in presets for Princesses.

Updated profiles for Smart Cuts (Princess.2S to 5S)

Profiles were updated for Smart Princess Cuts: Princess.2S, Princess.3S, Princess.4S and Princess.5S.

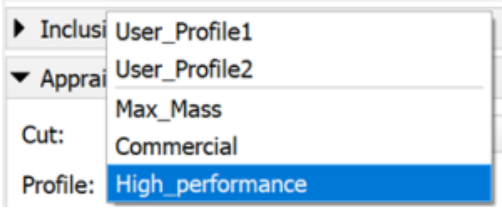Princess 2S   Princess 3S   Princess 4S   Princess 5S

Each Smart Princess cut has five profiles.

Three non-editable pre-configured profiles:

- High_performance
- Commercial
- Max_Mass

Two user profiles:

- User_Profile1
- User_Profile2

▶	Inclusi	User_Profile1
▼	Apprai	User_Profile2
		Max_Mass
Cut:		Commercial
Profile:		**High_performance**

Pre-configured profiles are designed to give users a fast start with the allocation and consider the user's needs. Three profiles are required to grant the user the desired range of options:

- Princess allocated with the High_performance profile will receive high performance and symmetry. But mass may be lower in comparison with the remaining 2 profiles.
- Commercial profile gives balanced performance and yield.
- Max_Mass profile is designed to give high yield solutions but can sacrifice Optical performance.

Solutions created with pre-configured Profiles are shown in the Cutwise Project:

https://cutwise.com/projects/4fb21e39-ac88-493e-8fc7-afe6923b7fb2/solutions?sort=w4B9EC74vbhVPzAFwEmEHY3MQfaX3DIOaZQ


The first pair of solutions are created by 22.Single Recut and 22.SmartRecut using the High_Performance profile. Note the Optical performance of these solutions.
The second pair of solutions uses the Commercial profile and the third pair uses the Max_Mass profile. Max_Mass solutions have lower optical performance and Symmetry, but higher yield.

Users can select one of the pre-configured profiles and immediately go to the allocation procedure without laborious Profiles modification.

For users that want to manually adjust Profiles – Pre-configured profiles can be a good starting point for modification. Users can copy Parameters from pre-configured profiles to one of the editable profiles User_Profile1 or User_Profile2 and then modify desired Parameters (for instance, Total depth, Table or Crown/Pavilion Main facets Slopes limits) as per Factory requirements.

Smart Cut appraisers forms

SmartCut works full-fledged if good start form set appropriating to factory standards. Open Diamond Parameter panel and adjust the parameters so that the form has high Optical Performance and Excellent grade.
If start form grade is worse than EX then global allocation algorithms will not work correctly.
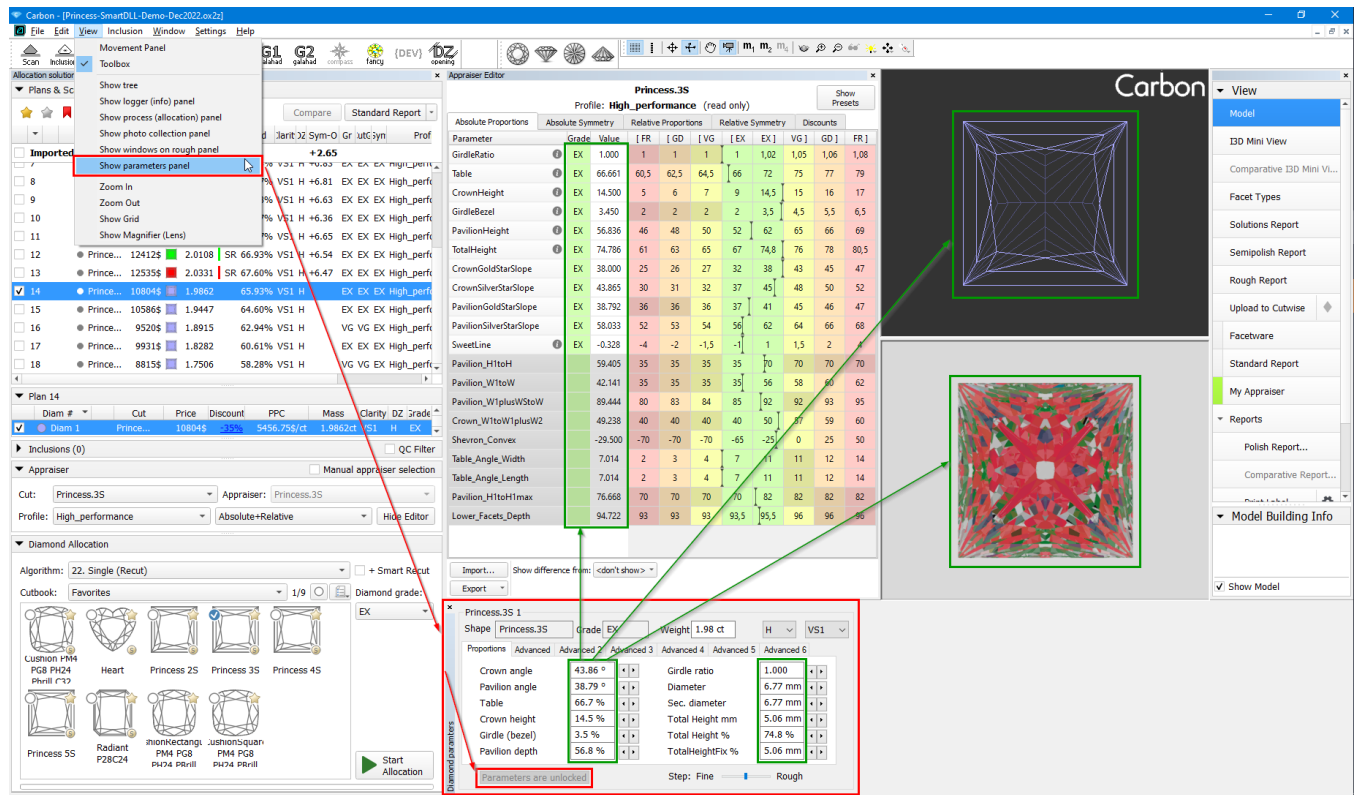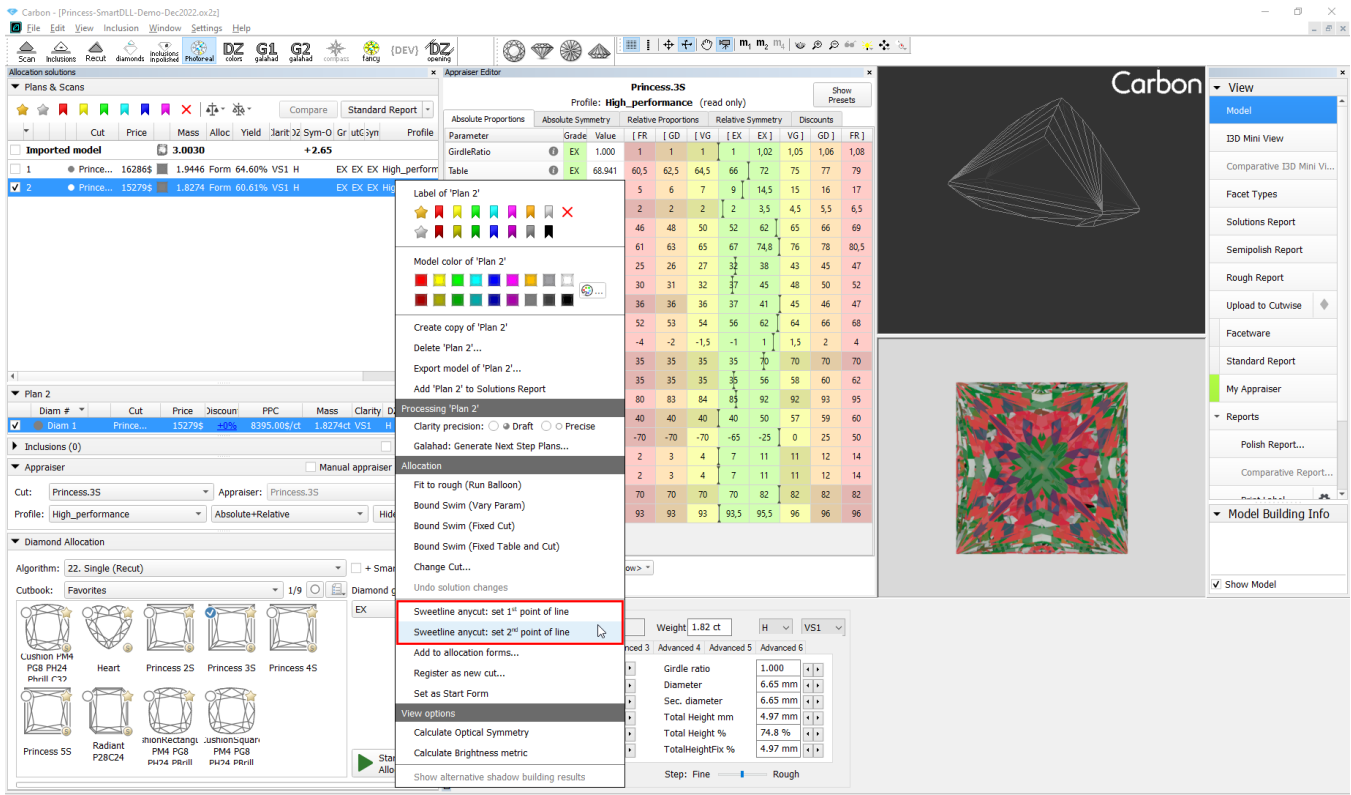
Set the form as a Start Form using the context menu.
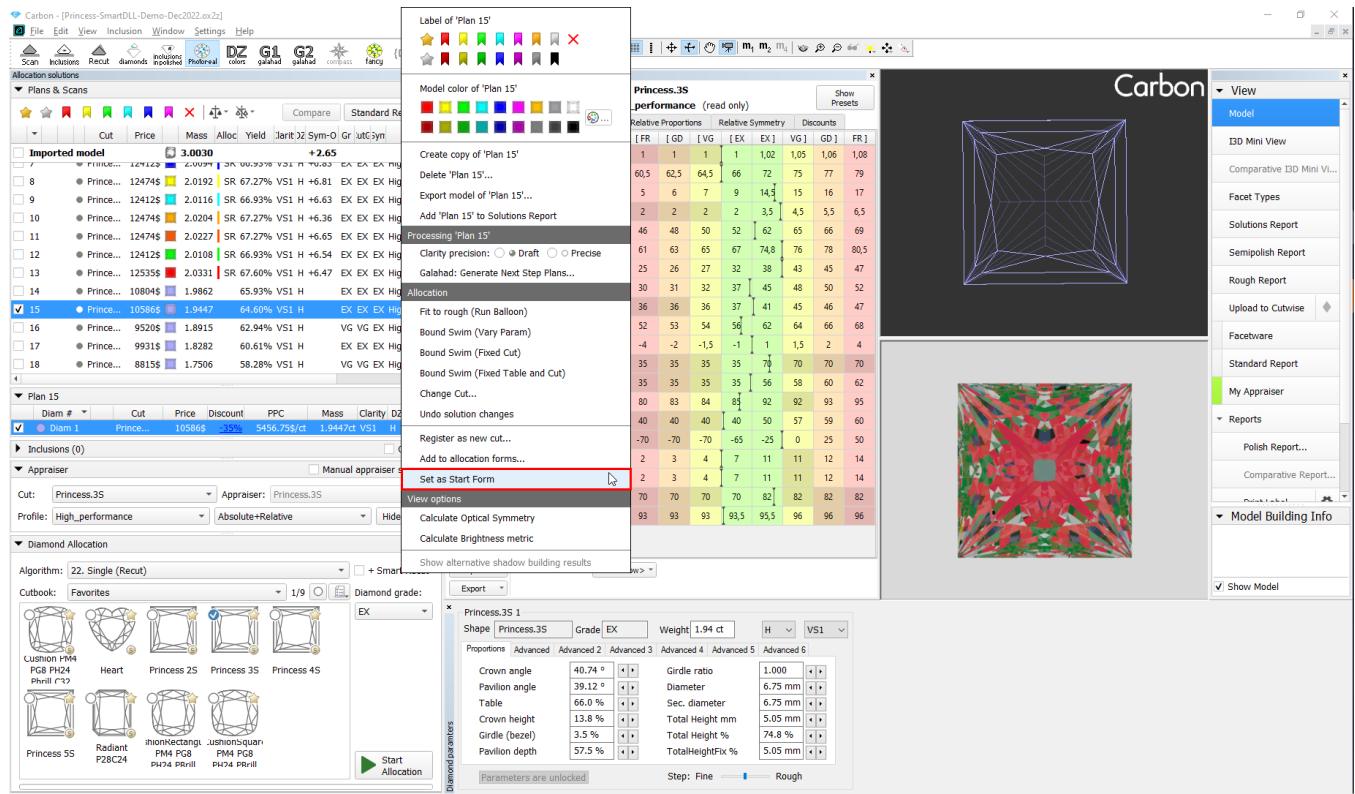
Sweetline requires two good forms (see documentation on Goodwin). Create the second Sweetline form in the same way (via Diamond Parameter). Add the form using the context menu.
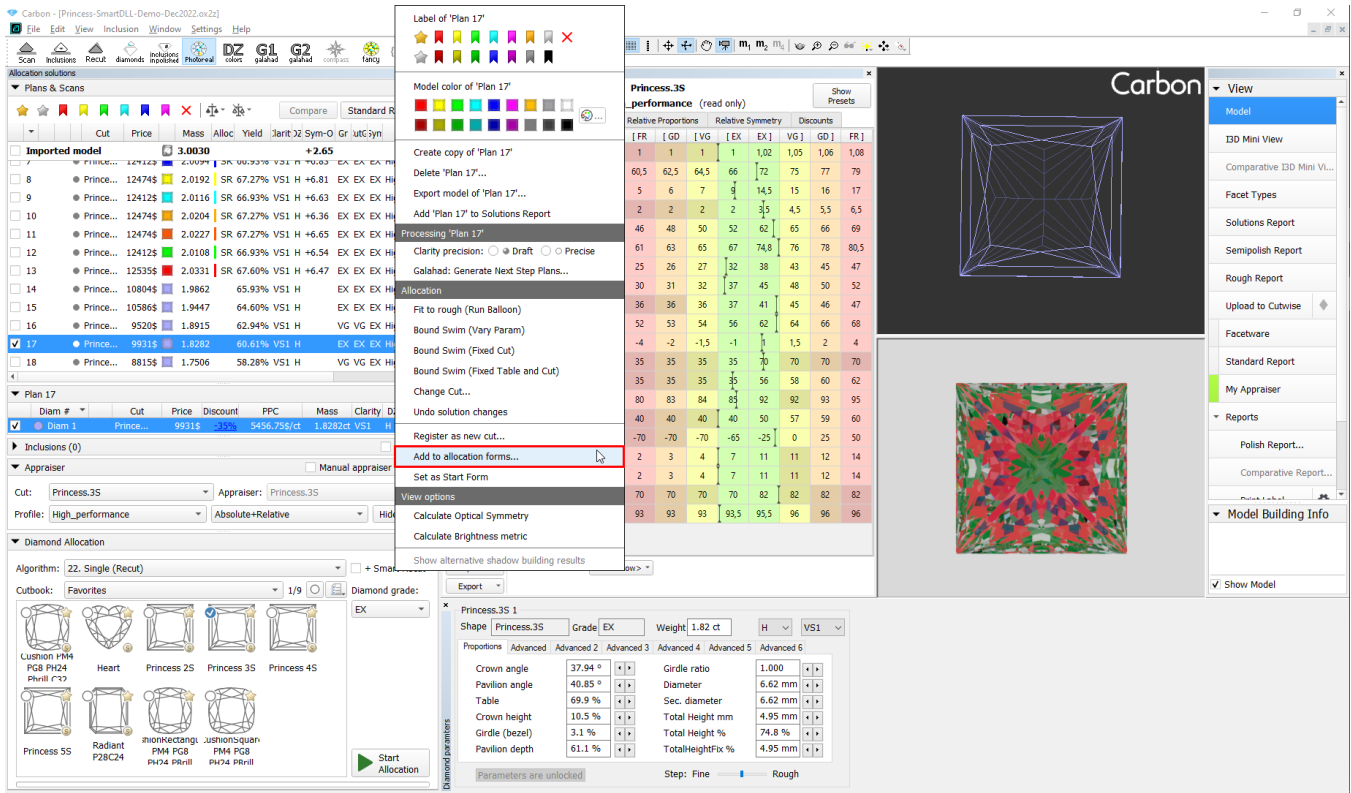
Mark required forms as Sweetline forms.

Gold and Silver Stars in Facet Types

Factories have their limits on the angles of certain facet types. They need an easy way to specify which angles should be controlled in optimization and displayed in reports.
For this purpose, the new attributes has been introduced - Gold and Silver Stars.

There is a video about Gold and Silver Stars:

Video | Gold and Silver Stars in Facet Types

Your browser does not support the HTML5 video element

Video summary:

- New attributes for Facet Types are introduced - Gold and Silver Stars
- Gold and Silver Stars symbolize the primary and additional slope angles.
- When registering a new Goodwin Cut, you can choose the template that is most appropriate for your cut and appraiser requirements.
- When registering you can open Facet Types to adjust the stars. - The slope angles are the same in the appraiser, in the Standard and in the i3D mini reports. And Cutwise gets the same values.

Video keywords: Gold Stars, Silver Stars, Facet Types

Data: PrincessDemo.ox2z

Gold Stars symbolize the primary facets of the crown and pavilion and Silver Stars additional angles that factories control in their appraisers.

If the Cut has Gold Stars in Facet Types, then the CrownGoldStarSlope Proportions (Crown angle average) and PavilionGoldStarSlope Proportions (Pavilion angle average) are calculated by the facets marked by Gold Star groups. Symmetry additionally controls deviations of facets with same type and tier but all different subtypes.
Similarly calculations are made for CrownSilverStarSlope and PavilionSilverStarSlope if the Cut has Silver Stars.
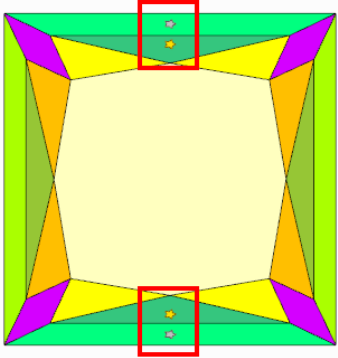

Registration

When registering a new Goodwin Cut, you can choose the template that is most appropriate for your cut and appraiser requirements.

For example, in GoodwinGoldStars template, "1C1P" means that the Cut must have one (Gold) Star on the crown and pavilion. In GoodwinStars2C2P template, "2C2P" means that the Cut must have both Stars (Gold and Silver) on the crown and pavilion.

The following cases are possible:

Case 1. The stars are set automatically.

Most often you will see the message "Stars has been set automatically, you can open Facet Types to adjust".
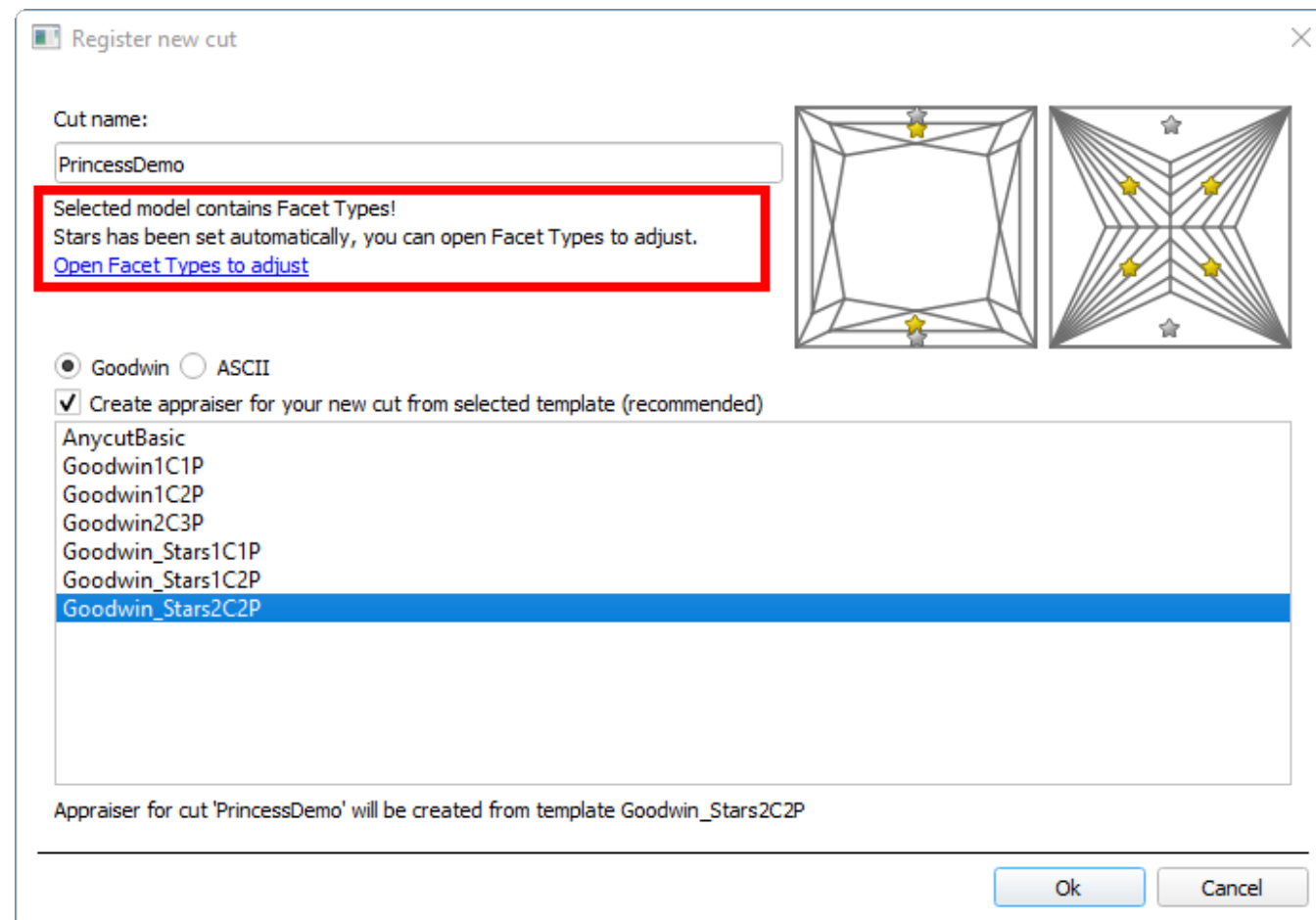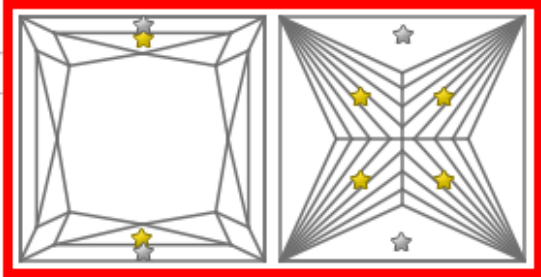
It means you can "Open Facet Types to adjust", call the context menu and set the Stars on the desired facet groups.
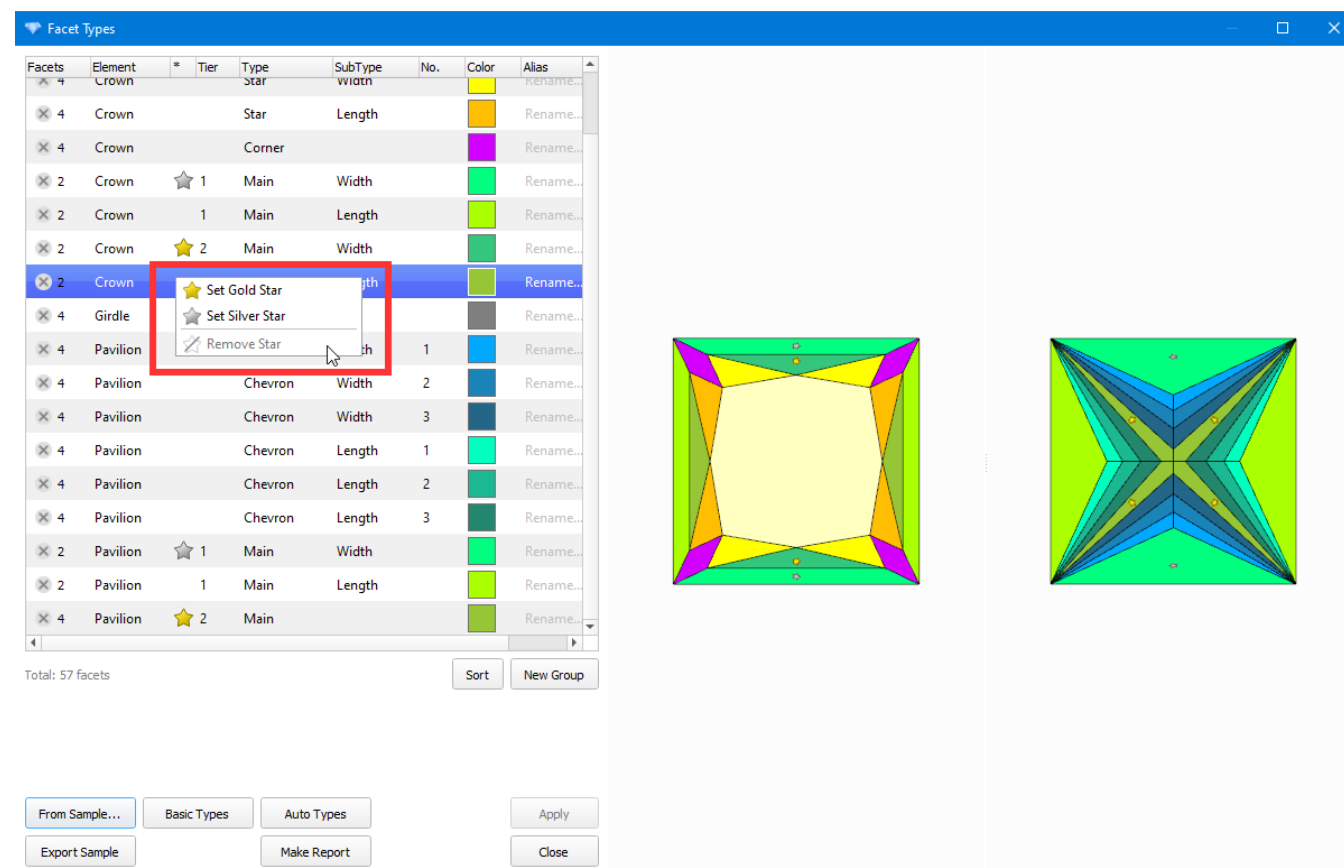
Then click Apply, close the Facet Types window and register your Cut.

Also, you may see the facets marked with the Stars on the thumbnail on the right.
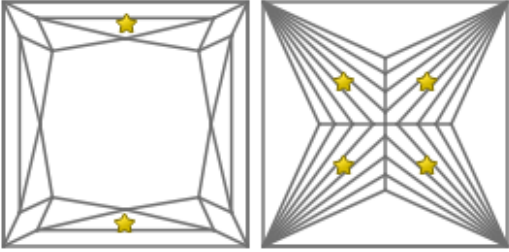
Case 2. The message "Failed to set the Stars automatically. Please set them manually in Facet Types with the context menu" will appear.

In this case, you must open the Facet Types window and manually set the stars on the desired facets groups through the context menu.

> ⚠️ **Note!** In this case, we recommend checking your Facet Types, as stars should be placed automatically on normal Facet Types.

Case 3. If your cut already has stars on the desired facet groups, go through the normal cut registration steps. This can happen if you create a new cut from solution with cut that already had stars.
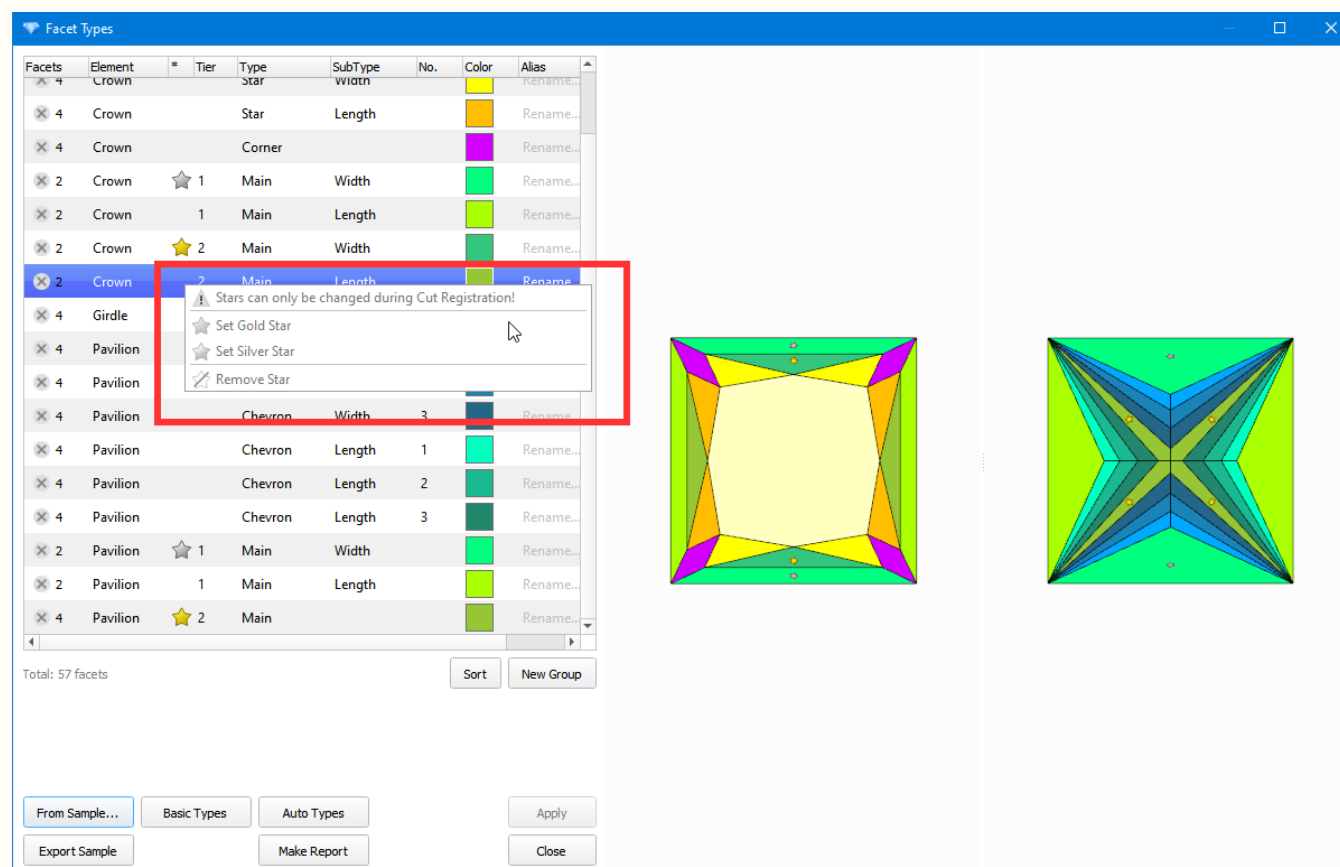
Reporting

After stars marking the slope angles are *the same* in the Appraiser Editor panel:

...and in the Standard Report:

Standard Report

Cut: Princess

Template: Standard Report for princess

Enhanced precision: 0 digits

Cut	Princess	Model	2
Spread	-0.58 ct, -19.19 %	Scale weight, ct	N/A
Extra Facet Girdle / Nat	No	Corrected mass, ct	3.61, 3.6089
Cut appraiser	PrincessDemo	Cut grade	VG
Symmetry appraiser	PrincessDemo	Sym grade	EX
Model building info	N/A	Final grade	--

Parameter	Avg		Min	Max	Dev
Girdle Ratio (L\W)	1.013		--	--	--
Width, mm	8.239 mm		--	--	--
Length, mm	8.342 mm		--	--	--
Total height, %	6.214 mm	75.43 %	--	--	--
Crown height: Side, %	1.024 mm	12.43 %	12.43	12.43	0.00
Crown height: Corner, %	1.024 mm	12.43 %	12.43	12.43	0.00
Pavilion height: Side, %	4.885 mm	59.29 %	59.29	59.29	0.00
Pavilion height: Corner, %	4.885 mm	59.29 %	59.29	59.29	0.00
Table: Side, %	5.721 mm	69.01 %	68.82	69.20	0.38
Table: Corner w.r.t. Corner, %	58.55		58.55	58.55	0.00
Table: Corner w.r.t. Width, %	83.32		83.32	83.32	0.00
Diameter: Corner, %	11.725 mm	142.31 %	142.31	142.31	0.00
Girdle thickness: Side, %	0.305 mm	3.70 %	3.70	3.70	0.00
Girdle thickness: Corner, %	0.305 mm	3.70 %	3.70	3.70	0.00
Culet, %	0.000 mm	0.00 %	0.00	0.00	0.00
Crown Corner height, %	12.43		12.43	12.43	0.00
Crown angle, °	35.09		35.09	35.09	0.00
Crown first angle, °	42.63		42.63	42.63	0.00
Crown Corner angle, °	22.86		22.86	22.86	0.00
Pavilion angle, °	39.81		39.58	40.03	0.45
Pavilion first angle, °	58.64		58.35	58.92	0.56
Girdle facet angle, °	90.00		90.00	90.00	0.00
Table offset, %	0.000 mm	0.00 %	--	--	--
Culet offset, %	0.047 mm	0.57 %	--	--	--
Table-culet offset, %	0.047 mm	0.57 %	--	--	--

...and in the I3D mini report:

Slope

Mode:
- ○ No Labels
- ◉ Slope, °
- ○ Azimuth, °
- ○ Facet Type
- ○ Facet Height, mm
- ○ Facet Height, %
- ○ Axis Symmetry

- ☐ Deviation From Average
- ☐ Girdle Thickness
- ☐ Junctions
- ☑ Facet Number
- ☐ MIC (Crown / Pavilion View)
- ☐ Invisible Edges
- ☑ Average Parameters
- ☐ Legend

View:
- ☑ Sync with scene

Font size:
11

Crown	Pavilion
Left	Right
Front	Rear
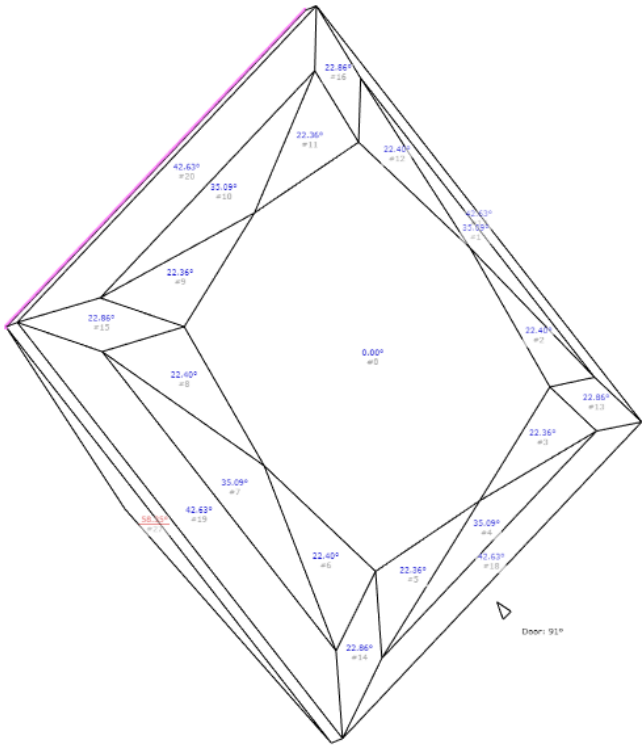
	Diameter		Crown angle	Pavilion angle	Table: Side	Culet	Spread	Extra facet girdle / Nat
minimum	maximum	average						
8.239 mm	11.725 mm	10.556 mm	35.09°	39.81°	69.01 %	0.00 %	-19.19 %	No

Width	Length	Ratio (L/W)	Crown height: Side	Pavilion height: Side	Total height	Girdle height		
						Bezel	Bone	Valley
8.239 mm	8.342 mm	1.013	12.43 %	59.29 %	75.43 %	3.70 %	3.70 %	N/A %

...and after upload to cutwise.com (https://cutwise.com/diamond/485183):
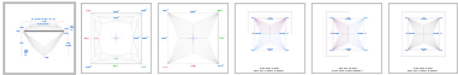
Proportions

Length × Width	8.342 mm	8.239 mm
Total Height	75.43%	6.214 mm
Table	69.01%	5.721 mm
Crown Angle	35.09°	
Crown Height	12.43 %	1.024 mm
Pavilion First Angle	58.64°	
Pavilion Angle	39.81°	
Pavilion Depth	59.29%	4.885 mm
Girdle	3.7%	0.305 mm
Culet	0%	0 mm
Diameter Ratio	1.013	

Change Cut: algorithm of manual allocation (Tools)

In solution with one or more diamonds operator can relatively quickly check what its weight and cost will be if you replace the cut of one of the diamonds. This operation can be used for solutions obtained by standard algorithms as well as for solutions obtained from external sources. For example, run the 13. Cascade-2M optimization for Brilliant and then replace the second diamond with Pear for one of the solutions.

To do this, you need to choose a solution and activate the diamond in it. Call the context menu, then the ChangeCut command.
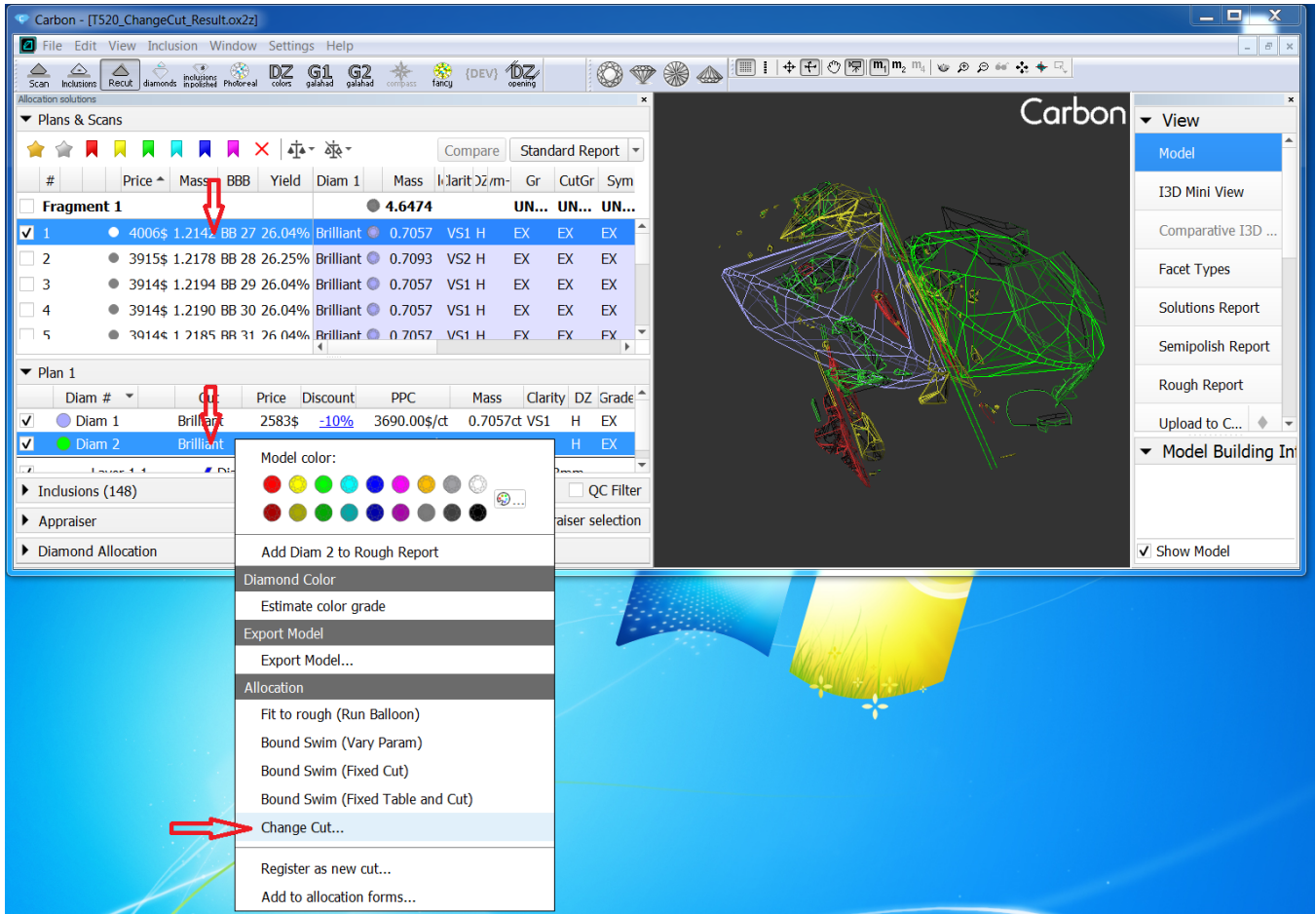
Then select new cut of the future diamond.
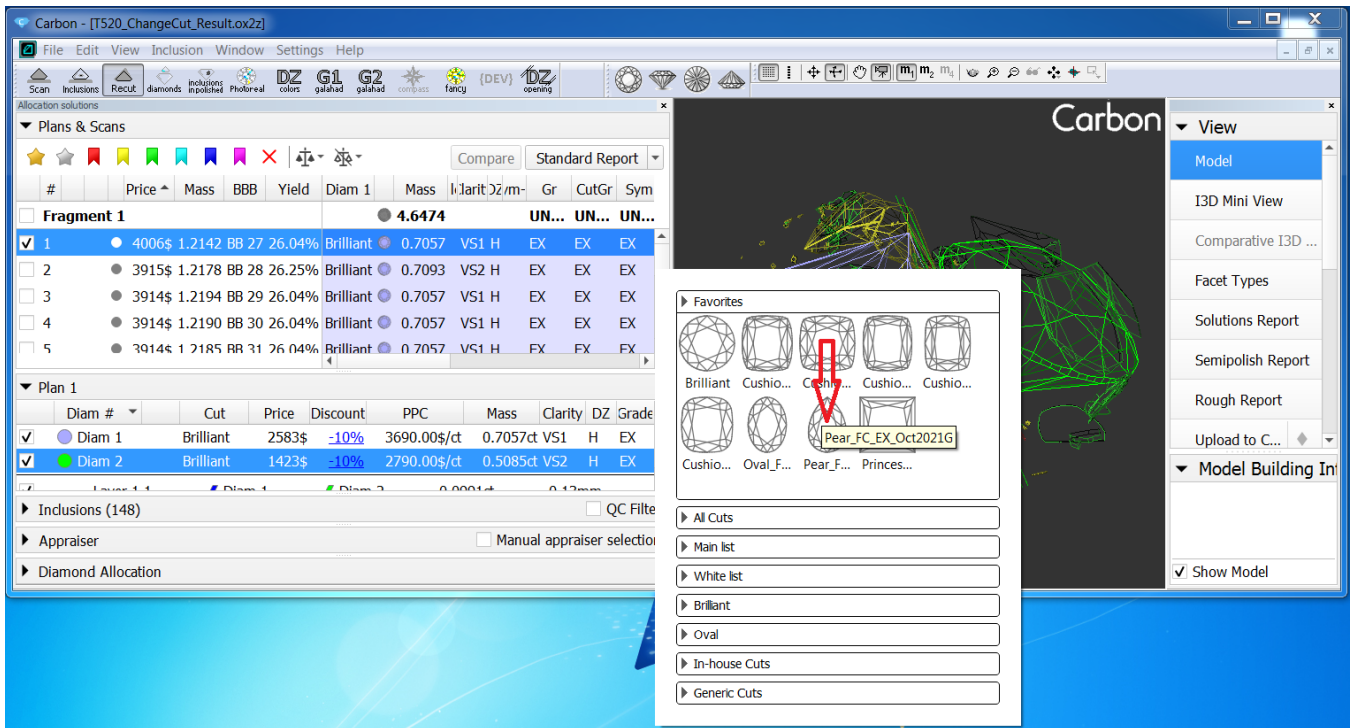
The algorithm starts. If there is a plane in the solution, then it will be used as an additional constraint. The algorithm replaces cut, saves the approximate location of the diamond, iterates of the yellow inclusions, and chooses the best solution. The forms of in-house cuts and forms from appraisers are not used.

After the algorithm completed, in the solution list, operator can observe the cost after changing the cut.

If for some reason you are not satisfied with the solution with a new facet, you can undo the changes made by calling the Undo Solution changes command from the context menu of the solution.
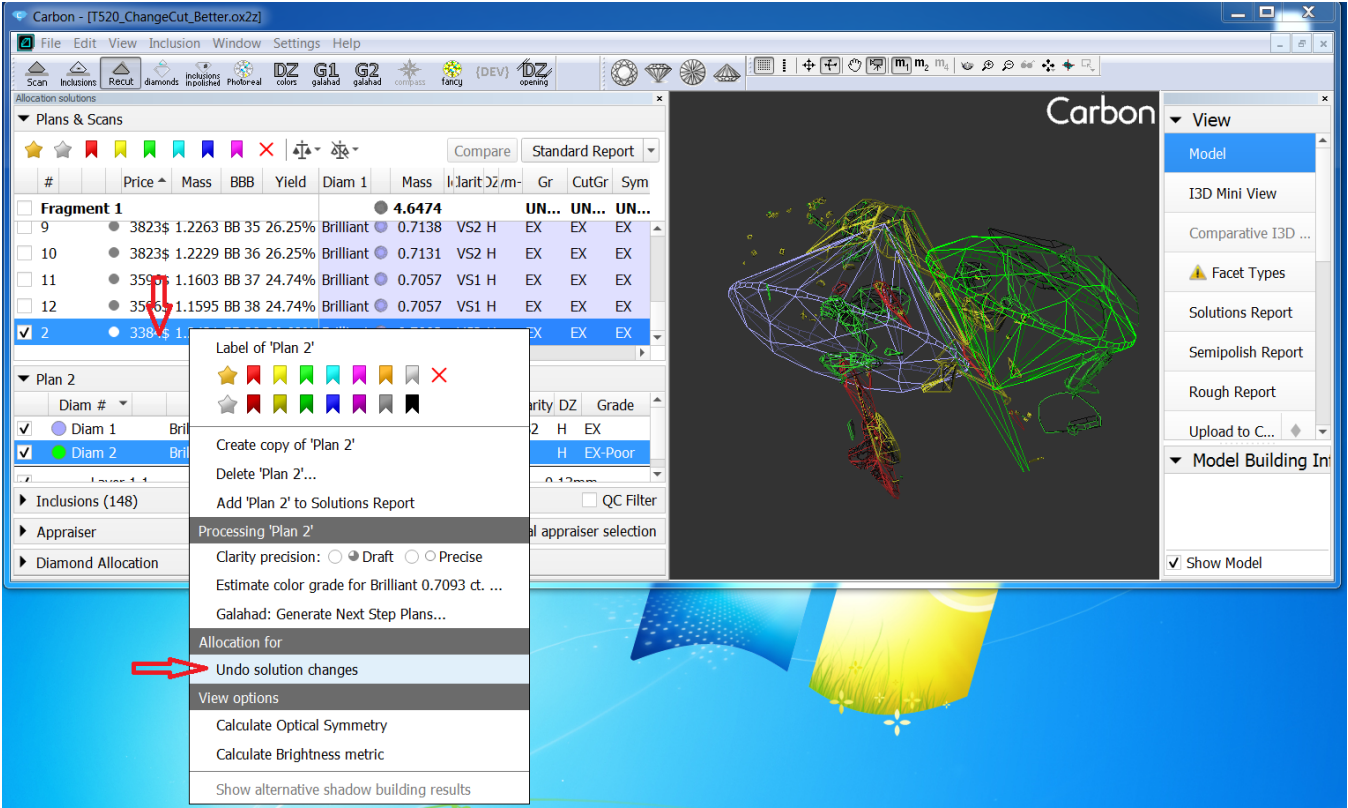
The increment price of the solution using the ChangeCut operation is an indicator that initially the list of cuts for optimization was far from optimal.

> ⚠️ **Note**
>
> Please note that algorithm **Change Cut...** in Carbon differs from **Change Cut...** in Pacor/Helium Rough!
>
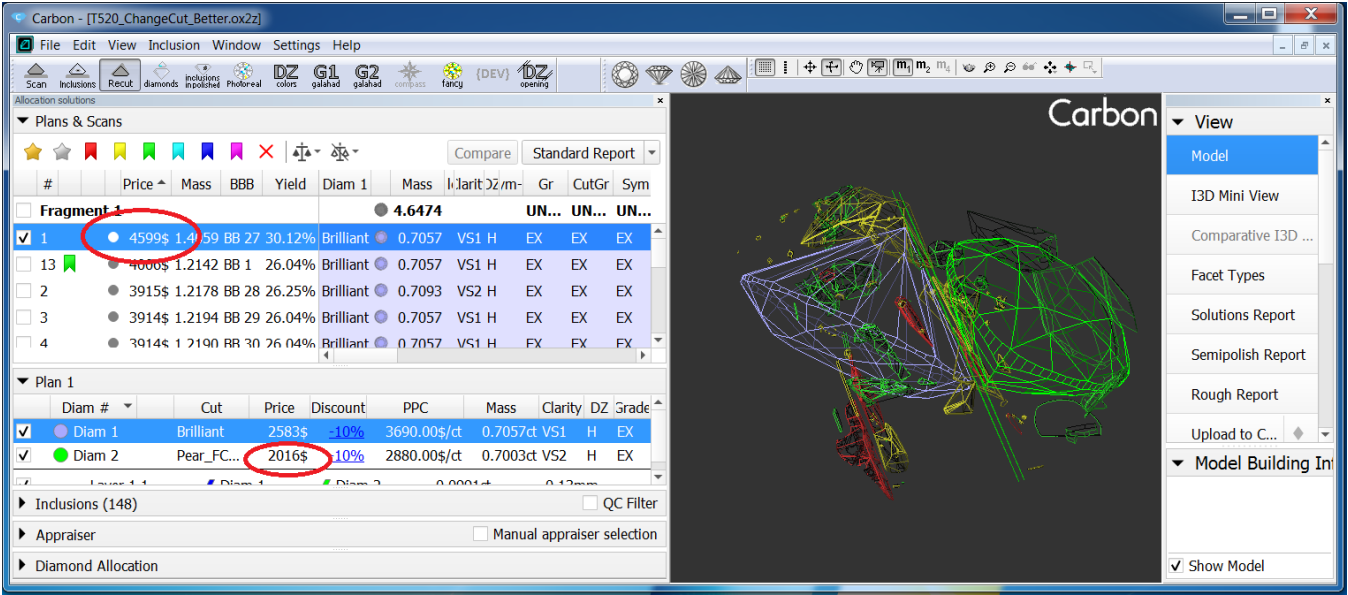> Difference is that Carbon algorithm uses layers in solution as limitation. So diamond after **Change cut...** tool can not be located behind layer even if placement of diamond behind layer allows to increase it's mass.
>
> This is known bug and will be fixed in next version.

Remaining Depth - new Mode in Comparative I3D Reports

For optimal work on brutting, the cutter needs to see in the current moment the discrepancies of values between the planned girdle and the one obtained during scanning.

In Comparative I3D Reports, New mode - Remaining was added by two variants, color projection of the distance on the scan and reference model. This mode can be enabled by the button -

"Remaining Depth". The projections can be changed by the button - "Remaining Depth Current or Reference". On Legend a color scale was added of the distance.

Slice-type inclusion sandwich editing

There is a known "inclusion sandwich" technique used to allow the allocation algorithms to consider the part of inclusion inside the solution.
In some cases operator might improve the diamond plan modifying the sandwich configuration according to actual plan orientation and the remaining size of the inner part of inclusion.

Since current version it is possible to adjust the configuration of "slice" type inclusion sandwich manually.

How to?

1. Select the part of inclusion sandwich you need to adjust with the "inclusion selection tool" and/or the inclusion list.
2. When the required part of sandwich is activated select the object movement mode button in the upper toolbar ("hand" icon). The delimiting plane of the slice sandwich is shown like a circle-saw in the scene.
3. Move and rotate this plane with mouse.
4. Hold down the left mouse button and move the mouse ("drag" the mouse) - this makes the plane rotation, when you also hold the "Shift" key along mouse drag, the plane is moving.
   On the end of each movement when left mouse button is released, the sandwich configuration is recalculated instantly.
5. Once you see that the sandwich has reached the required configuration you may try to improve the plan with the bound swim tool.
6. Once you finished work with inclusion sandwich ensure to deactivate object movement mode by switching to normal view mode ("camera" icon).

Video	Inclusion sandwich - Change the sandwich geometry (Recalc)			
Published:	2022, December 15	**Last Updated:**	2021, December 15	**v.1.0**
Your browser does not support the HTML5 video element				
Video keywords: Sandwich, inclusion, editing				

Improvements in Sample21 model building method

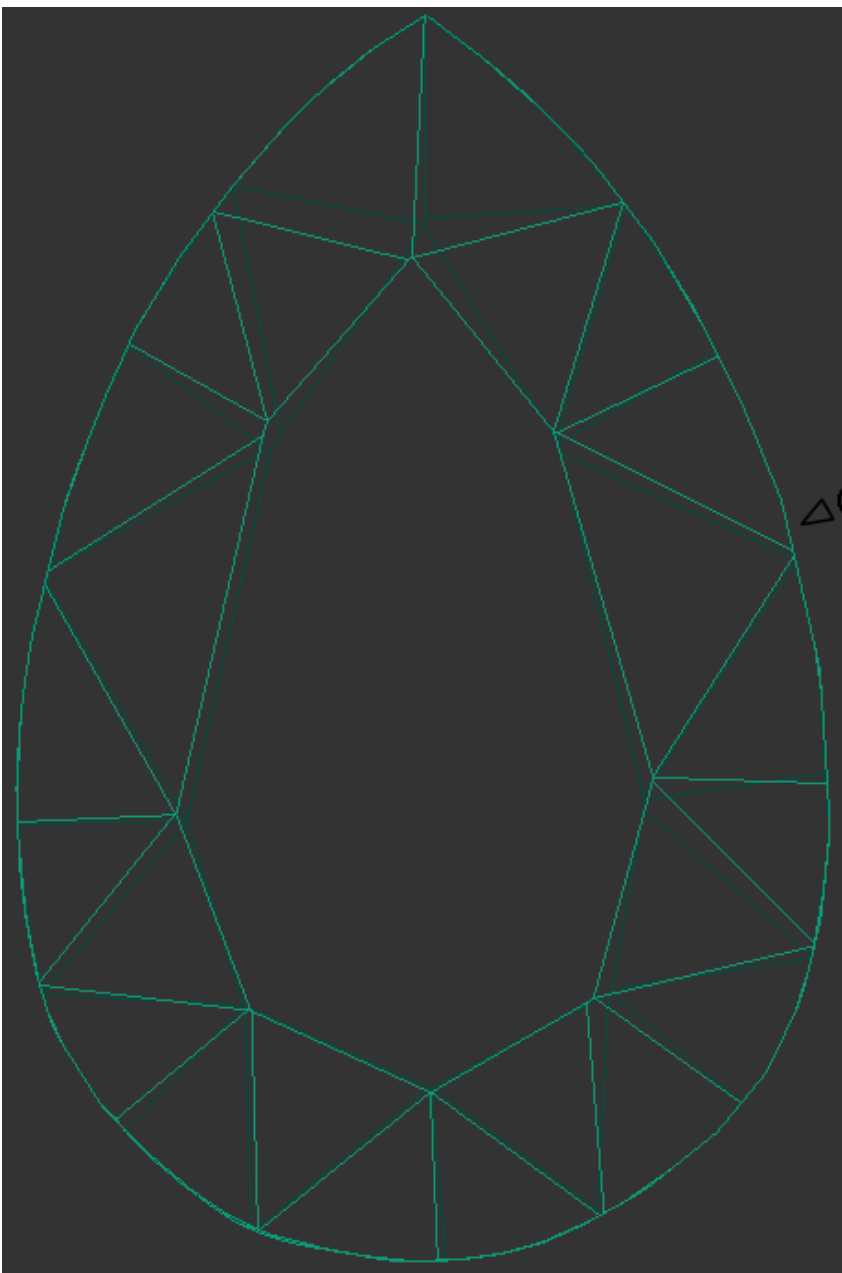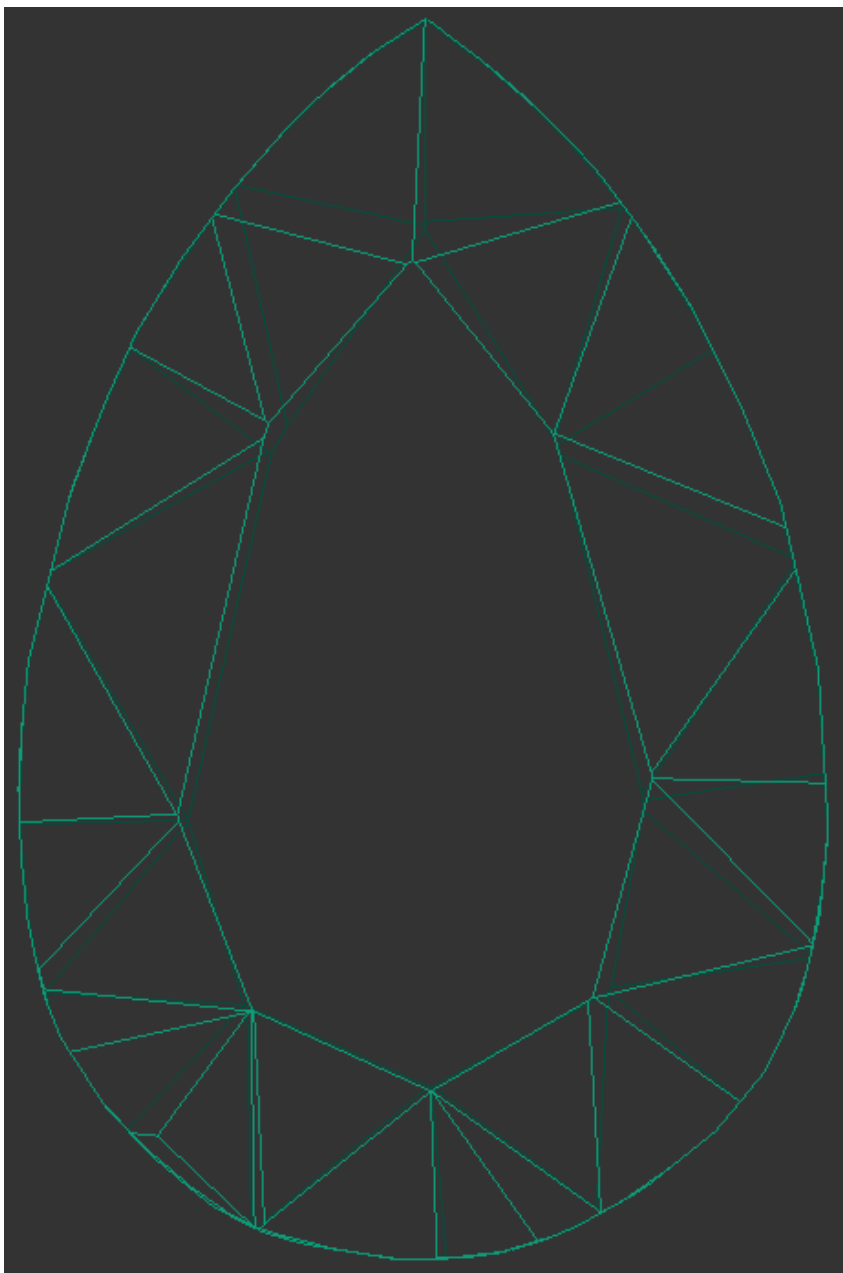Model building is improved for Sample21 method.
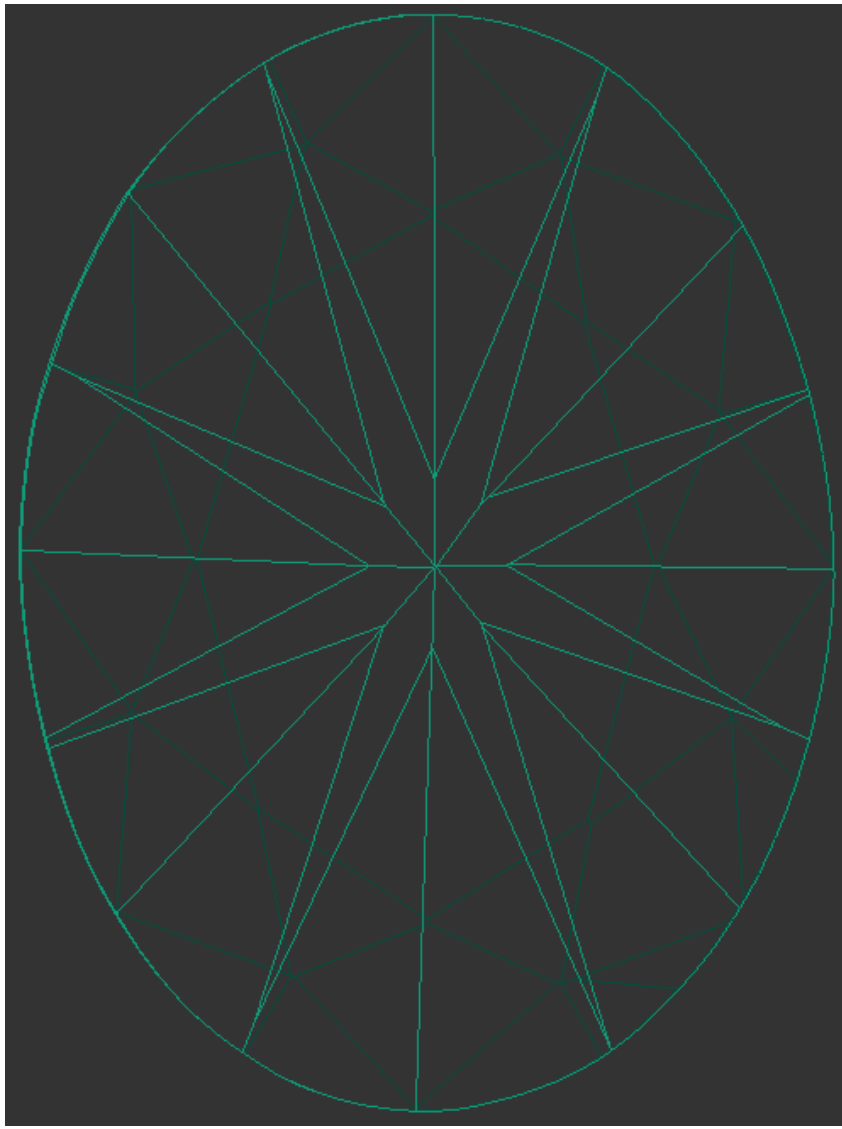
This is link to manual how to apply Sample21 method.

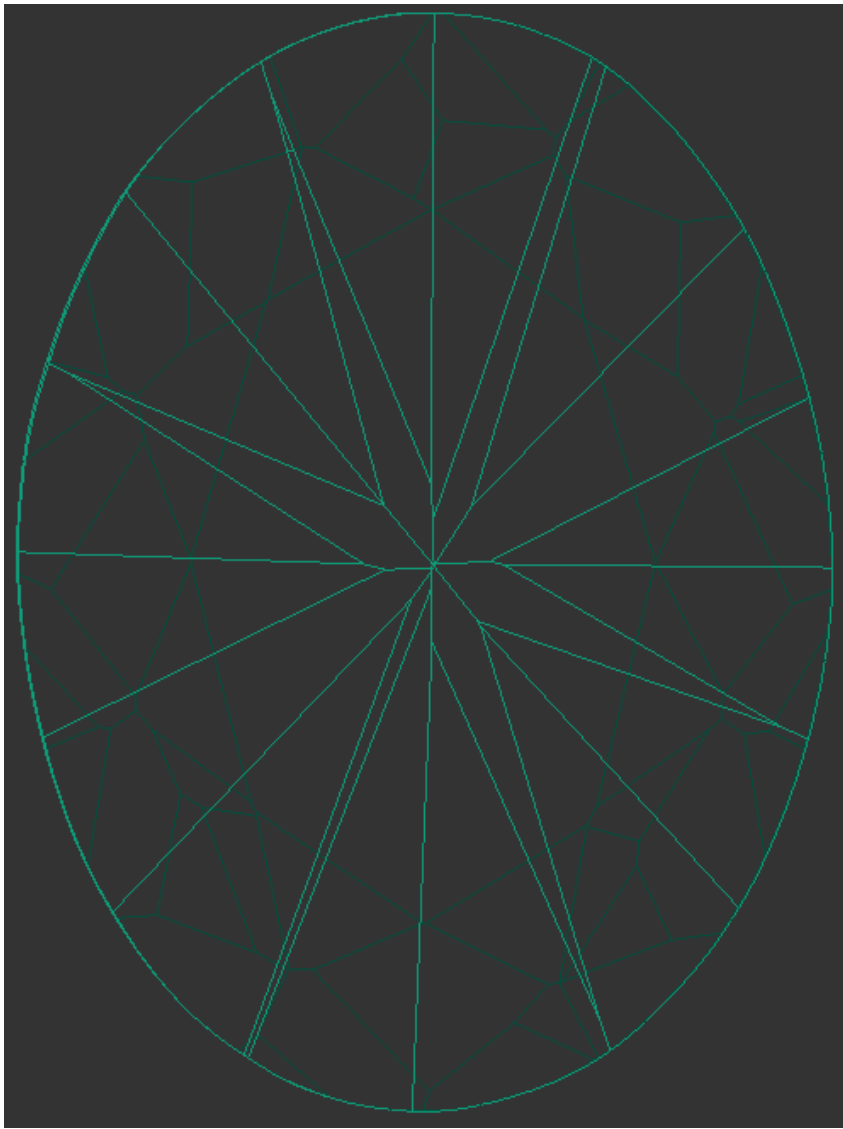Examples of improvement:

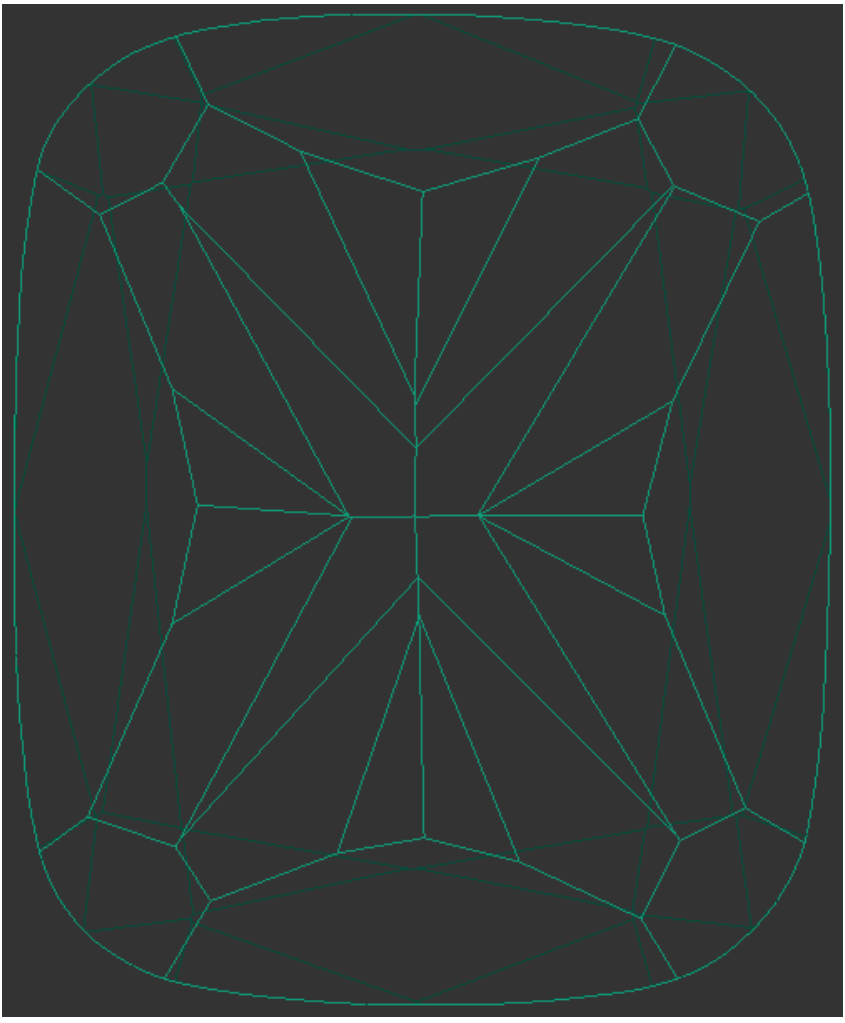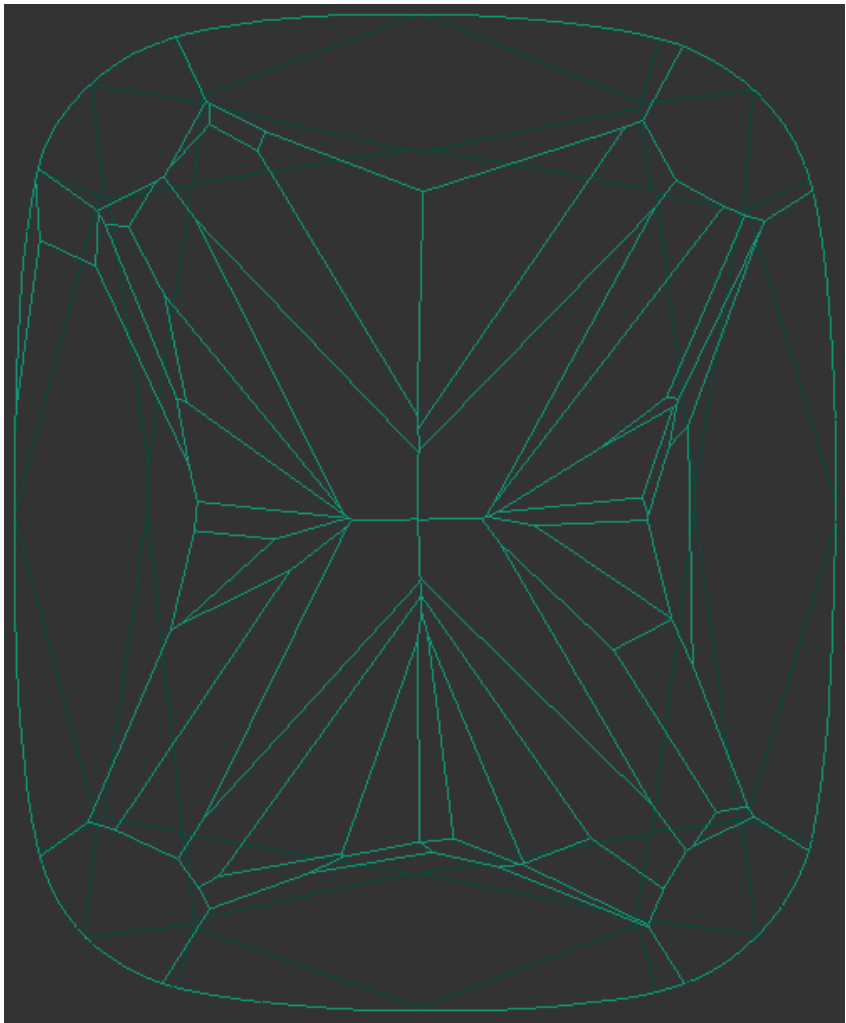|	
Pear_Sample21.ox2z Pear_Sample21.dmc	

Oval_WTB_Sample21.ox2z

Oval_WBT_Sample21.dmc
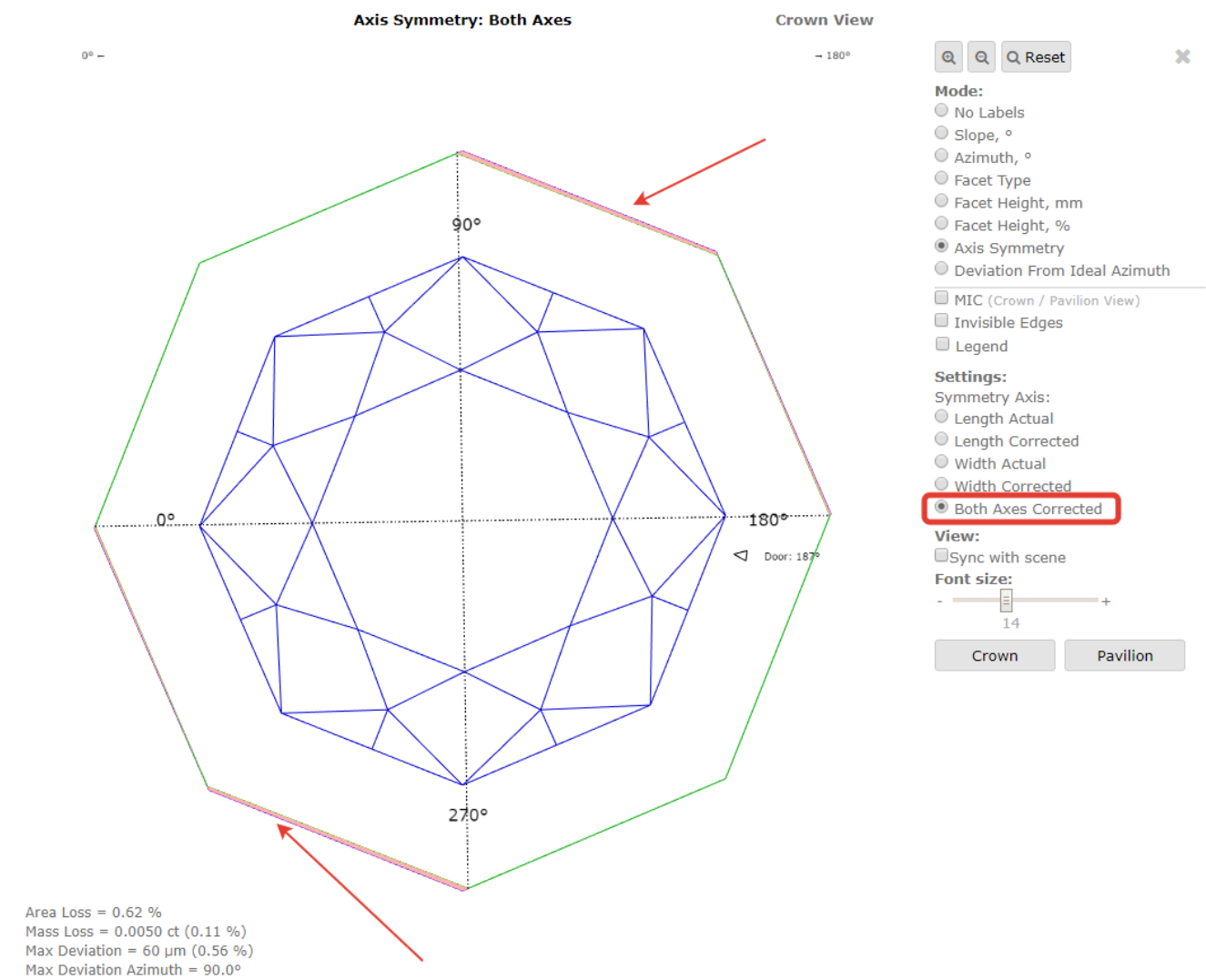
Cushion_Sample21.ox2z

Cushion_Sample21.Dmc

Changes in I3D Report

Implemented red-green fill for "Both axes corrected" mode:

Area Loss = 0.62 %
Mass Loss = 0.0050 ct (0.11 %)
Max Deviation = 60 μm (0.56 %)
Max Deviation Azimuth = 90.0°

Price list adaptation for Melee diamonds

There is a new procedure for determining the price of diamonds weighing less than 0.0584ct (Sieve up to +9).

PPC - tables of Price per Carat depending on weight, as well as color, clarity and other discounts.

Mass2 - the weight of the diamond rounded to the boundary X,XX85

Mass4 - the weight of the diamond rounded to the X.XXXX5 boundary (usual math rules for 4 digits)

Previously

- the cost for all diamonds was determined as Mass2*PPC(Mass2)

Now

- the cost of diamonds weighing 0.0585ct and above remained the same according to the formula Mass2*PPC(Mass2)
- the cost of diamonds weighing 0.0585ct and below is determined by the new formula Mass4*PPC(Mass2)

Examples of pricing for Brilliant-D-IF without additional discounts

Weight	Mass2	PPC	Old Price	New Mass	New Price
Weight	Mass2	PPC	Old Price	New Mass	New Price
0.001	0.00	660	0.00	0.001	0.66
0.005	0.00	660	0.00	0.005	3.30
0.009	0.01	660	6.60	0.009	5.94
0.015	0.01	660	6.60	0.015	9.90
0.038	0.03	660	19.80	0.038	25.08

0.049	0.05	750	37.50	0.049	36.75
0.057	0.05	750	37.50	0.057	42.75
0.065	0.06	750	45.00	0.06	45.00

This made it possible to launch global optimization algorithms for low-weight rough diamonds.

Fixed problems and improvements

- Fixed bug with missing report template "HTML5_Illustrated_report_for_step_cut.html StepCut report template
- Fixed bugs in the algorithm SmartNormalize for Princess cut.
- Appraiser template Goodwin_GoldStar1C1P was renamed into Goodwin_Stars1C1P