

ClearCalc

INDEPENDENT CALCULATION SOFTWARE



Intelligent Automation in Radiation Oncology

RAD formation

Intelligent secondary plan validation.

ClearCalc is a secondary calculation software that independently verifies the accuracy of your treatment plan dose calculation. With support for photons, electrons, and brachytherapy, results are quickly calculated and displayed on a user-friendly interface.

ClearCalc can be accessed as a Varian Eclipse Treatment Planning System (TPS) scripting plugin via ClearCheck or as a Windows executable application, allowing full access for all users.

For clinicians. By clinicians.

ClearCalc was developed by physicists as an independent secondary monitor unit (MU) calculation to instantly verify treatment plan accuracy. With seamless ClearCheck integration, users obtain results without launching separate software or performing DICOM exports. Results can be automatically appended to the ClearCheck final plan report, making documentation needs effortless.

Have confidence in your calculations and automate your plan evaluation workflow.

ClearCalc

Rest assured knowing your plan calculations are accurate.



Multi-Modality
Compatibility



Eclipse
Integration



Tissue Heterogeneity
Correction



Automated Calculation
Point Selector



Intuitive User
Interface



Direct ClearCheck
Reporting

Direct Eclipse Integration via ClearCheck

With the option for direct integration with Eclipse and ClearCheck, ClearCalc takes automating plan evaluation one step further by providing instant processing of secondary plan calculations and eliminating the hassle of importing or exporting DICOM plans. ClearCalc results can be automatically added to the ClearCheck report for the final plan printout with a single click.

For users without Eclipse, there is a standalone option that accepts DICOM plan files from multiple treatment planning systems.

ClearCalc Secondary Calculation

| | |
|---|--|
| Test, Patient (999999999a) Birthdate: 11/22/2019 Sex: Male Hospital: Radformation Eclipse Version: 15.5.11 | Course: C1 Plan: Prostatelnit Dose: 180cGy × 25 = 4500cGy Prescribed Percentage 100% 100.00% covers 96.00% of Target Volume (Value: 106.175%) Status: PlanningApproved |
|---|--|

| | |
|--------------------------|--------------------------------|
| Photon Properties | |
| TPS Machine: Eclipse CAP | ClearCalc Machine: Eclipse CAP |

MU Results

| Field ID | Calculation Point | TPS MU | ClearCalc MU | Difference | Pass/Fail | Comment |
|----------|-------------------|--------|--------------|------------|-----------|---------|
| Field 6 | Isocenter 1 | 80.1MU | 80.8MU | 0.87% | ✓ | |
| Field 5 | Isocenter 1 | 69.7MU | 71.0MU | 1.87% | ✓ | |
| Field 4 | Isocenter 1 | 72.5MU | 74.1MU | 2.21% | ✓ | |
| Field 3 | Isocenter 1 | 77.2MU | 77.9MU | 0.91% | ✓ | |
| Field 2 | Isocenter 1 | 77.2MU | 75.4MU | -2.33% | ✓ | |
| Field 1 | Isocenter 1 | 72.5MU | 72.7MU | 0.28% | ✓ | |
| Field 7 | Isocenter 1 | 78.2MU | 76.2MU | -2.56% | ✓ | |

Calculation Point Doses

| Calculation Point | TPS Dose | ClearCalc Dose | Difference | Pass/Fail | Comment |
|--|----------|----------------|------------|-----------|---------|
| Isocenter 1 -0.04cm, -0.10cm, 18.41cm | 185.4cGy | 185.2cGy | -0.11% | ✓ | |

Custom Point Selection

Plan Points
Toggle display of points from plan
 Isocenter 1

Display Options
Scroll using mouse wheel.
Zoom using Ctrl + Mouse wheel.
Pan using Ctrl + Left mouse click/hold.
 Show dose wash
 Show central-axis field lines

ClearCalc Points Legend
ClearCalc recommended calculation points, color-coded

- Good agreement for all fields
- Good agreement for some fields
- Agreement not adequate for all fields

Field MU Results
Use the per-field Locate button to view or edit assigned calculation point.
With the Locate button active, click the point in the CT viewer to assign a new field calculation point.

| Field ID | Calculation Point | TPS MU | ClearCalc MU | Difference | Pass/Fail |
|----------|---|--------|--------------|------------|-----------|
| Field 1 | Isocenter 1 <input checked="" type="checkbox"/> | 73.1MU | 72.4MU | -0.96% | ✓ |
| Field 2 | Isocenter 1 <input checked="" type="checkbox"/> | 76.9MU | 74.2MU | -3.51% | ✓ |
| Field 3 | Isocenter 1 <input checked="" type="checkbox"/> | 77.9MU | 78.5MU | 0.77% | ✓ |
| Field 4 | Isocenter 1 <input checked="" type="checkbox"/> | 73.1MU | 74.5MU | 1.92% | ✓ |
| Field 5 | Isocenter 1 <input checked="" type="checkbox"/> | 70.2MU | 71.3MU | 1.57% | ✓ |
| Field 6 | Isocenter 1 <input checked="" type="checkbox"/> | 78.8MU | 78.4MU | -0.51% | ✓ |
| Field 7 | Isocenter 1 <input checked="" type="checkbox"/> | 78.8MU | 76.2MU | -3.30% | ✓ |

Select Calculation Point for All Fields

Calculation Point Doses
Select a row to view the calculation point location.

| Calculation Point | Location [x, y, z] | TPS Dose | ClearCalc Dose | Difference | Pass/Fail |
|-------------------|---------------------------|----------|----------------|------------|-----------|
| Isocenter 1 | -0.04cm, -0.10cm, 18.41cm | 185.4cGy | 186.6cGy | 0.64% | ✓ |

With ClearCalc’s custom point selection tool, an optimal calculation point is chosen automatically, avoiding heterogeneities and dose gradients. Alternatively, with a number of points generated and viewable on the patient’s CT within ClearCalc, selecting a point that makes the most sense for your department is simple.

One Platform for all Your Second Check Needs

Photon Calculation Module

The screenshot displays the Photon Calculation Module interface. On the left, a sidebar shows the course 'C1', plan 'TestPlan', and dose '180cGy x 45 = 8100cGy'. The main area is divided into three sections:

- Photon Properties:** Shows 'TPS Machine' as 'ClearCalc Machine' and 'Eclipse CAP' selected in a dropdown.
- MU Results:** A table with columns: Field ID, Calculation Point, TPS MU, ClearCalc MU, Difference, Pass/Fail, Verify, and Comment. Two rows are shown, both with 'Pass/Fail' as '✓'.
- Calculation Point Doses:** A table with columns: Calculation Point, Location [x, y, z], TPS Dose, ClearCalc Dose, Difference, Pass/Fail, Verify, and Comment. One row is shown with 'Pass/Fail' as '✓'. A 'View/Edit Calculation Points' button is below.
- Calculation Parameters:** A table with columns: Field ID, Field 1, and Field 2. Rows include Energy (6X), Gantry/Collimator/Table (179.0/0.0/0.0), Dose Calculation Point (Isocenter 1), Dose (85cGy, 96.4cGy), X1 [cm] (-3.3, -3.2), X2 [cm] (+3.3, +2.9), Y1 [cm] (-3.2, -3.3), Y2 [cm] (+2.9, +3.3), MLC Model (Millennium 120), MLC Plan Type (VMAT), Wedge (-, -), and Applicator (-, -).

ClearCalc supports a full complement of clinical techniques, including 3DCRT, IMRT, VMAT, SBRT, SRS, and virtual/ dynamic wedges.

The custom finite-sized pencil beam (FSPB) algorithm ensures that calculations are fast and accurate, fully accounting for tissue inhomogeneities.

One Platform for all Your Second Check Needs

Electron Calculation Module

The screenshot displays the Electron Calculation Module interface. On the left, a sidebar shows the course 'C2', plan 'Test Plan', and a dose calculation of $200\text{cGy} \times 5 = 1000\text{cGy}$. The main area is divided into three sections:

- Electron Properties:** Includes 'TPS Machine' (EclipseCAP_TB), 'ClearCalc Machine' (Electron Test), and 'Dose Calculation Method' (Prescribed %).
- MU Results:** A table showing the results for Field 1.
- Calculation Parameters:** A table of parameters for Field 1, including Energy, Gantry/Collimator/Table, Dose, and various correction factors.

| Field ID | TPS MU | ClearCalc MU | Difference | Pass/Fail | Verify | Comment |
|----------|---------|--------------|------------|-----------|--------|---------|
| Field 1 | 201.2MU | 201.5MU | 0.13% | ✓ | | |

| Field ID | Field 1 |
|--------------------------------------|--------------------|
| Energy | 12E |
| Gantry/Collimator/Table | 0.0/0.0/0.0 |
| Dose [cGy] | 200 |
| Dose at Reference Condition [cGy/MU] | 1.000 |
| Depth Dose % | 99.00 |
| Equivalent Depth [cm] | 3.237 |
| Applicator Size [cm x cm] | 10x10 |
| Cone Factor | 1.000 |
| Cutout Factor Method | Sector Integration |
| Source to Skin Distance [cm] | 100 |
| Bolus | - |
| Total Output Factor | 1.003 |

Electron plan evaluation is made simple using ClearCalc. Compute field doses to a prescribed percentage or choose a reference point, with the option to enter measured cutout factors or use automated sector integration. Calculations are based on AAPM TG-71 formalism.

One Platform for all Your Second Check Needs

Brachytherapy Module

Course: Brachy
Plan: Brachy Plan
Dose: 500cGy x 3 = 1500cGy

Radioactive Source Model
 TPS Source: VS Ir-192 (5mm)
 ClearCalc Source: Varian Ir-192 HDR VS2000

| Source Property | TPS | ClearCalc |
|-----------------------------|-----------|-----------|
| Air kerma strength [U] | 18803.030 | 18803.030 |
| Activity [Ci] | 4665.764 | 4665.764 |
| Dose rate constant [cGy/hU] | 1.101 | 1.101 |
| Active length [cm] | 0.500 | 0.500 |

Calculation Point Doses

| Calculation Point | Location | TPS Dose | ClearCalc Dose | Difference | Pass/Fail | Verify | Comment |
|-------------------|--------------------------|-----------|----------------|------------|-----------|--------------------------|---------|
| Plan Point | 0.60cm, 0.06cm, 18.41cm | 1504.4cGy | 1525.7cGy | 1.42% | | | |
| Calc Point | -2.05cm, 0.07cm, 18.08cm | 1500.6cGy | 1424.1cGy | -5.01% | ✗ | <input type="checkbox"/> | |

Treatment Plan Parameters

| Channel 1 | | | Channel 2 | | | Channel 3 | | |
|----------------|------------|--------------------------|----------------|------------|-------------------------|----------------|------------|--------------------------|
| Dwell Position | Dwell Time | Location | Dwell Position | Dwell Time | Location | Dwell Position | Dwell Time | Location |
| 130.0cm | 47.2s | -1.71cm, 0.02cm, 19.94cm | 130.0cm | 55.0s | 1.60cm, 0.02cm, 19.94cm | 130.0cm | 51.3s | 0.01cm, 0.02cm, 20.65cm |
| 129.5cm | 53.8s | -1.71cm, 0.02cm, 19.44cm | 129.5cm | 71.2s | 1.58cm, 0.02cm, 19.44cm | 129.5cm | 64.4s | -0.01cm, 0.02cm, 20.15cm |
| 129.0cm | 56.9s | -1.70cm, 0.02cm, 18.94cm | 129.0cm | 83.1s | 1.58cm, 0.02cm, 18.94cm | 129.0cm | 69.1s | -0.02cm, 0.02cm, 19.65cm |
| 128.5cm | 61.4s | -1.69cm, 0.02cm, 18.44cm | 128.5cm | 79.5s | 1.59cm, 0.02cm, 18.44cm | 128.5cm | 84.5s | -0.02cm, 0.02cm, 19.15cm |
| 128.0cm | 56.4s | -1.68cm, 0.02cm, 17.94cm | 128.0cm | 66.2s | 1.60cm, 0.02cm, 17.94cm | 128.0cm | 85.4s | -0.01cm, 0.02cm, 18.65cm |
| 127.5cm | 49.3s | -1.67cm, 0.02cm, 17.44cm | 127.5cm | 62.4s | 1.63cm, 0.02cm, 17.44cm | 127.5cm | 74.7s | -0.01cm, 0.02cm, 18.15cm |
| 127.0cm | 40.5s | -1.63cm, 0.02cm, 16.94cm | 127.0cm | 57.9s | 1.64cm, 0.02cm, 16.94cm | 127.0cm | 54.6s | 0.00cm, 0.02cm, 17.65cm |
| 126.5cm | 35.7s | -1.60cm, 0.02cm, 16.45cm | | | | 126.5cm | 75.0s | 0.02cm, 0.02cm, 17.15cm |
| | | | | | | 126.0cm | 35.6s | 0.04cm, 0.02cm, 16.65cm |

ClearCalc uses calculation methods outlined in AAPM TG-43. Incoming reference points are calculated and results are easy to interpret. Applicators, dwell positions, and dwell times are displayed for verification.

ClearCalc is an automatic secondary plan calculation software that streamlines plan evaluation workflow.

- ✓ **Full integration with Eclipse and ClearCheck streamlines planning workflows**
- ✓ **Accepts DICOM imports from multiple TPS vendors for flexibility in mixed environments**
- ✓ **Automatic optimal calculation point selector saves time**
- ✓ **Supports 3D, IMRT, VMAT, SBRT, SRS, brachytherapy, electrons, and more in a single solution**

ClearCalc simplifies workflows and gives users confidence in their final treatment plans, saving departments time and streamlining plan evaluation.