



PHILIPS

 **VOLCANO**

Quick guide

Core

precision guided therapy system

Place business card here

The Philips Volcano imaging system should only be operated by trained personnel. The following information is presented for your convenience and is not meant to replace the operator's manual or appropriate training. When making a diagnosis or treatment decision, the information provided here is not a substitute for physician judgment, which should take into account other factors such as the patient presentation, history, etc.

Customer service

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Technical support

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IVUS

Step 1

Enter patient information

Enter patient information or select patient from DICOM worklist

Step 2

Connect catheter

Connect catheter to PIM

Digital IVUS PIM



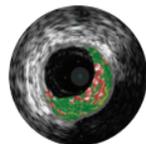
SpinVision pullback device



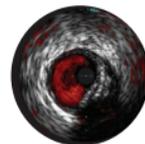
Step 3

Select image

- Select “Home”
- Select imaging modality:
 - If desired, activate ChromaFlo by pressing the “ChromaFlo” key on the control panel
 - Turn VH IVUS display on or off when VH data is available



VH IVUS imaging¹



ChromaFlo feature²

1. Safety and effectiveness of VH IVUS for use in the characterization of vascular lesions and tissue types has not been established.
2. Available on select catheters

Home/Live



Chroma



VH



Step 4

View live images and record

- For Eagle Eye: press “Ringdown” once the catheter exits the guide
- For Revolution: press the “Image” button on the PIM long enough to ensure proper function of the catheter by observing a pattern of partial bright concentric rings on the monitor

Record

- Press “Record” key on console
- Begin pullback
- Use “Bookmark” to identify a frame of interest
- Press “Stop” on console

Ringdown



Normalize

Record



Bookmark



Stop



IVUS

Step 5

Review recording and take measurements

- Use the “Play” and “Stop” buttons to review the video loop
- Measurements: take lumen, vessel and/or diameter measurements using the toolbar options



Play



Option

- Select “Measure” for automatic lumen and/or vessel border detection
- Press “Save Frame” to save measurements

Measure



Save Frame



Step 6

Acquire additional images

Press “Home” and repeat steps 3-5

Step 7

To review previous images

Click on “Case Explorer” and select the video loop of interest

Home/Live



Step 8

End case and archive

- End case:
 - Select “End Case” tab
 - Verify patient information and click “OK” to save to hard drive
- Archive (DVD or DICOM):
 - Select “Archive” tab
 - Select case to be archived
 - Select “DVD Media” or “DICOM Network”
 - Click on “Start Archive”

FFR and iFR startup

Step 1

Start FFR/iFR modality

- Open the IVUS modality and enter patient information
- Press the “Select Mode” button at the bottom left side of the screen to switch to FFR mode
- Press “Home” on the controller or click on the FFR or iFR tab



Step 2

Wire preparation

- Flush the wire leaving it in the hoop



- Connect the wire to the Pimmette
- Wait for the system to auto-zero the wire; Do not move the wire until zeroed
- Insert the wire and advance until the sensor is just outside the guide catheter

Step 3

Normalize wire pressure at the guide catheter tip

- Remove wire introducer, flush guide catheter with saline to remove any residual contrast, and tighten hemostasis valve
- Press “Normalize” to normalize the wire pressure (Pd) to the aortic pressure (Pa)
- Advance the wire distal to the lesion to make measurements

Ringdown



Normalize

FFR measurement

Measure the FFR Value

I.C. bolus injection

- Administer a bolus of hyperemic agent per hospital protocol and flush with saline
- Wait two cycles for the pressures to stabilize and press “Record”
- Press “Stop” and lowest FFR value will be displayed for this injection; “Print” or “Save Frame” for archiving if desired
- Press “Live” to make additional measurements with escalating doses of hyperemic agent if desired

I.V. infusion

- Begin infusion of hyperemic agent per hospital protocol and press “Record”
- After two minutes, maximum hyperemia should be achieved and lowest FFR displayed
- Press “Stop” and the lowest FFR value will be marked for this infusion; “Print” or “Save Frame” for archiving if desired



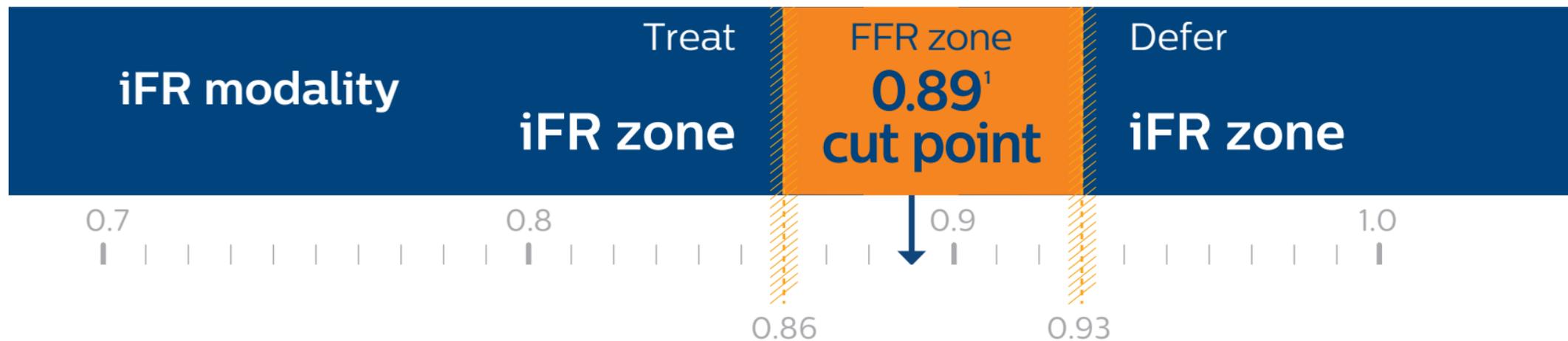
iFR spot measurement

Make an iFR spot measurement

- Make sure that the ECG waveform is displayed with a clear QRS complex
- Remove wire introducer, flush guide catheter with saline to remove any residual contrast, and tighten hemostasis valve
- Wait for a stable live iFR value
- Press “Record” to begin the iFR spot measurement
- After 5–25 cardiac cycles, the measurement will stop automatically and the iFR value will be displayed
- “Print” or “Save Frame” for archiving if desired



Hybrid iFR/FFR approach



94.0% match to FFR

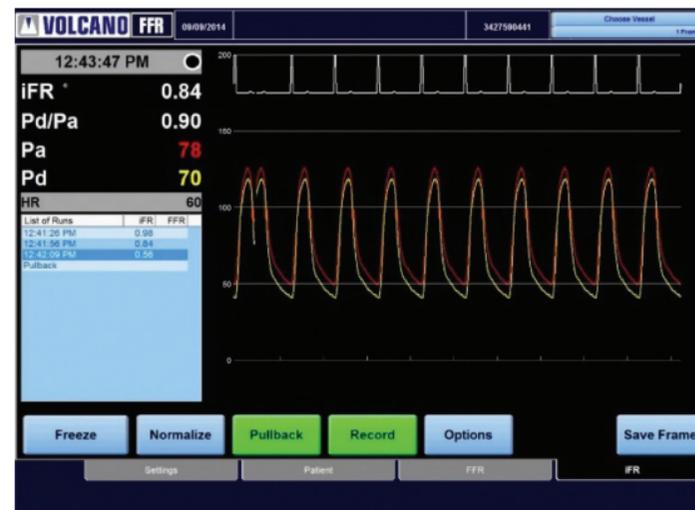
65.1% of patients may be free from hyperemia

1. An iFR cut-point of 0.89 matches best with an FFR ischemic cut-point of 0.80 with a specificity of 87.8% and a sensitivity of 73.0% (iFR operator's manual, 505-0101.27/001)

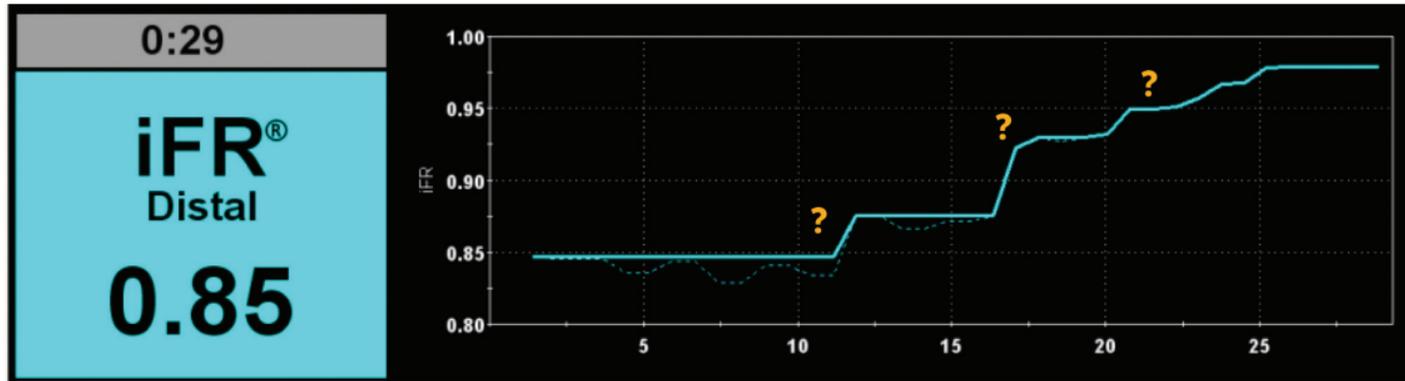
iFR pullback measurement

Make an iFR pullback measurement

- Make sure that the ECG waveform is displayed with a clear QRS complex
- Position the guide wire pressure sensor distal to all visible stenoses
- Remove wire introducer, flush guide catheter with saline to remove any residual contrast, and tighten hemostasis valve
- Wait for a stable live iFR value
- Press “Pullback” to begin the iFR pullback measurement
- Pull the guide wire back slowly to the tip of the guide catheter over 20–30 cardiac cycles
- Press “Stop” to end the measurement; “Print” or “Save Frame” for archiving if desired
- Review the pullback graph to determine the relative significance of the individual lesions
- Perform iFR spot measurements if desired



iFR pullback measurement



Review the pullback graph to determine the relative significance of the individual lesions.

Distal iFR

iFR at initial (distal) position of iFR pullback measurement

Trend line

Solid blue line for assessing the relative severity of individual lesions or diffuse disease

Raw line

Dashed line showing unfiltered data points

Measurement tools

Cross-sectional area references

- MLA > 4 mm² in LAD, LCX, and RCA vessels > 3 mm in diameter is associated with a low rate of events with medical therapy¹
- MLA < 6 mm² in left main correlates with FFR < 0.75 indicating physiological significance^{2,4}
- In ambiguous left mains deferral of revascularization where MLA ≥ 7.5 mm² appears to be safe^{3,4}
- Plaque burden and VH IVUS* imaging with plaque classification can further clarify lesion risk⁵
- Target minimum stent areas post-PCI may include ≥80% of the average reference lumen areas, 6 mm² for DES in non-LM vessels or other criteria depending on the type of PCI⁶

Data continues to emerge on IVUS/FFR/iFR correlations and optimal cutoffs for intervention and deferral of PCI. Cutoffs should be considered in the context of other clinical information. Contact your Philips Volcano representative for the latest references.

1. Abizaid AS, Mintz GS, Mehran R, et al. Long-term follow-up after percutaneous transluminal coronary angioplasty was not performed based on intravascular ultrasound findings: importance of lumen dimensions. *Circulation* 1999;100(3):256-261.
2. Jasti V, Ivan E, Yokomachi V, et al. Correlations between fractional flow reserve and intravascular ultrasound in patients with an ambiguous left main coronary artery stenosis. *Circulation* 2004;110(18):2831-2836.
3. Fassa AA, Wagatsuma K, Higano ST, et al. Intravascular ultrasound-guided treatment for angiographically indeterminate left main coronary artery disease. *J Am Coll Cardiol* 2005;45(2):204-211.
4. Levine, et al. 2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention. *J Am Coll Cardiol*, 2011; 58:44-122.
5. Stone GW, Maehara A, Lansky AJ, et al. A prospective natural-history study of coronary atherosclerosis. *N Engl J Med* 2011;364:226- 235.
6. Liu X, Doi H, Maehara A, et al. A Volumetric Intravascular Ultrasound Comparison of Early Drug-Eluting Stent Thrombosis Versus Restenosis. *J. Am. Coll. Cardiol. Interv.* 2009;2 ;428-434.

Diameter/area conversions

Diameter (mm)	Cross-sectional (mm ²)
2.00	3.14
2.25	3.98
2.50	4.91
2.75	5.94
3.00	7.07
3.25	8.30
3.50	9.62
4.00	12.57

*Safety and effectiveness of VH IVUS for use in the characterization of vascular lesions and tissue types has not been established.

Measurement tools

Length estimation tips

In-line digital display

- Start position at top: distal if recording a pullback; proximal if recording advancement
- End position at bottom: proximal if recording a pullback; distal if recording advancement



- If an automated pullback is used, lengths can be estimated using the in-line digital display
- In addition to, or in place of system-based length estimates, the Eagle Eye Platinum catheter's radiopaque markers can be used to facilitate length estimation by viewing the catheter in relation to the vessel segment of interest under fluoroscopy
 - First marker's leading edge is 10 mm from the proximal edge of the radiopaque scanner
 - Markers are spaced 10 mm apart, leading edge to leading edge; marker width is 1 mm

Eagle Eye Platinum catheter

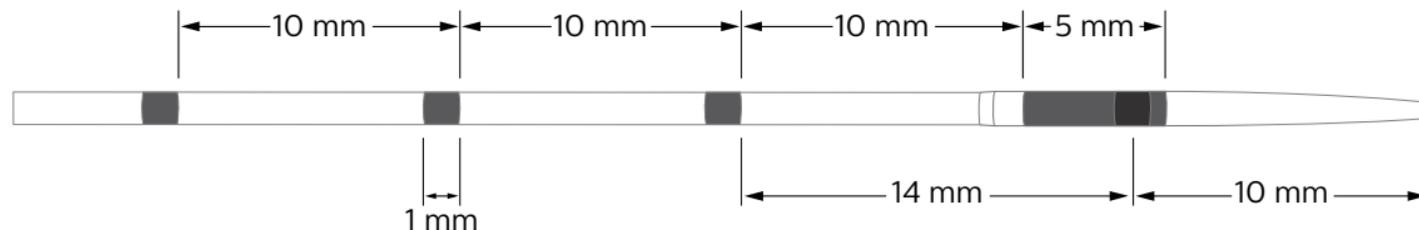
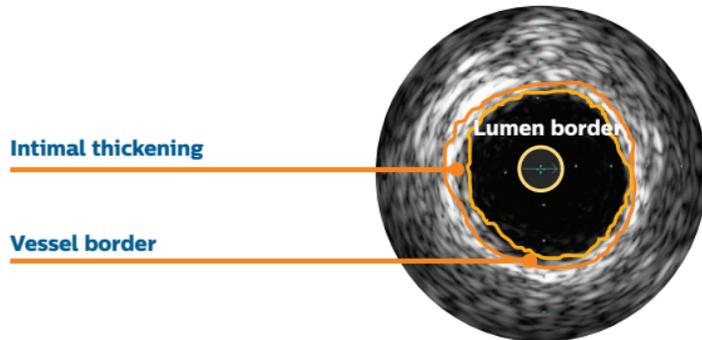


Image interpretation

Normal vessel

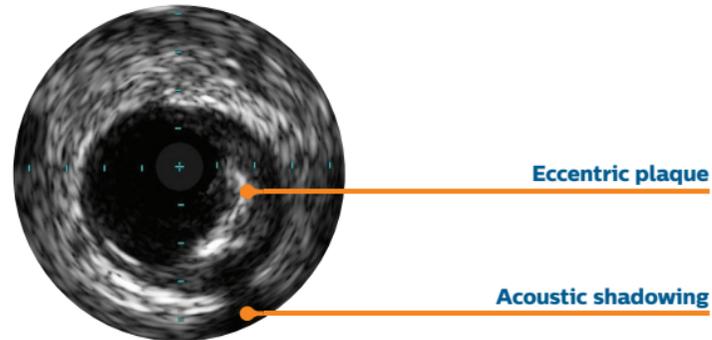
- Intimal layer is normally not seen unless it has begun to thicken
- Vessel border is drawn just inside the adventitia, which appears as a bright white ring
- The catheter mask (red area) indicates the location of the ultrasound transducer



Diseased vessel

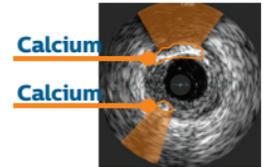
Eccentric plaque

Distributed non-circumferentially, this makes the assessment of disease by angiography especially prone to underestimation or overestimation depending on the angle of view



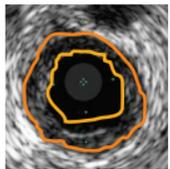
Plaque with calcium

- Calcium is indicated by very bright areas
- Calcium produces acoustic shadowing



Concentric plaque

- Distributed circumferentially
- Tends to occur in areas of negative remodeling



BRS

Because of the thickness and material of the struts, it is common for the the struts to present on ultrasound as a double line representing the leading and trailing edges of the struts

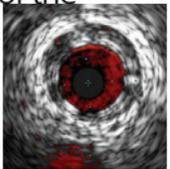
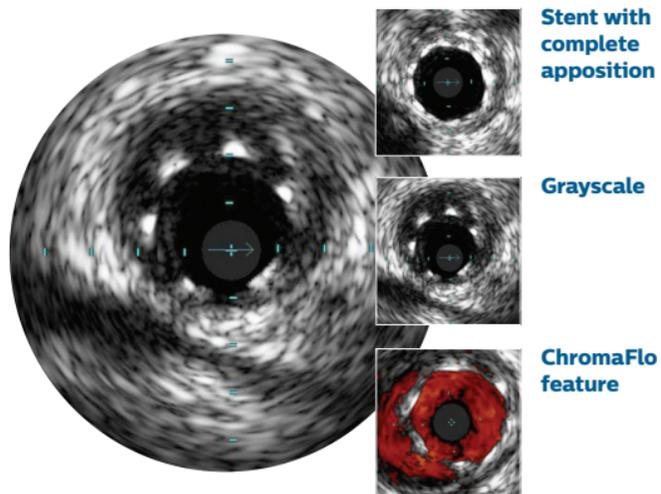


Image interpretation

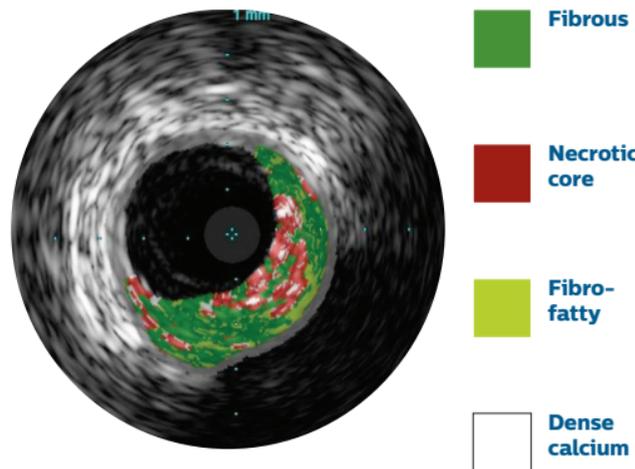
Stent with malapposition

Malapposition is indicated by blood visible behind stent struts

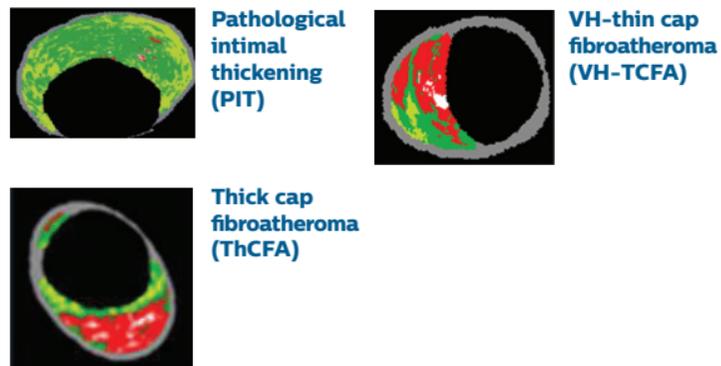


VH IVUS imaging: complete lesion assessment*

VH IVUS imaging classifies plaque into four tissue types with 93%–97% accuracy¹



PROSPECT defined lesion types



1. Nair A et al. Automated coronary plaque characterisation with intravascular ultrasound backscatter: ex vivo validation. *EuroInterv* 2007; 3:113-120.

*Safety and effectiveness of VH IVUS for use in the characterization of vascular lesions and tissue types has not been established



VOLCANO 8999

VL3: RCA PRE (UNDERBROVEN)

Gebied: 12.7mm²
Min. dia: 3.8mm
Max. dia: 4.2mm

Verschil: 0.8mm² (77.0%)

Gebied: 2.9mm²
Min. dia: 1.5mm
Max. dia: 2.1mm

Lij

Vrij

Betalen

Aan

Patient

Druk op linken voor automatische afgrenzing of maak een selectie in de contourtabel

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