

**MODEL 654 — SIDE-ON PHOTOMULTIPLIER TUBE (PMT) ASSEMBLY**

The photomultiplier tube (PMT) is among the most popular photosensitive devices in use today. Various tube types and treatments permit use of these detectors from the extreme Vacuum UV (VUV) through the Visible and into the near Infra-Red. Featuring large photosensitive areas, secondary emission multiplication, low dark noise and fast time response — photomultipliers are ideal for a broad range of spectroscopy applications.

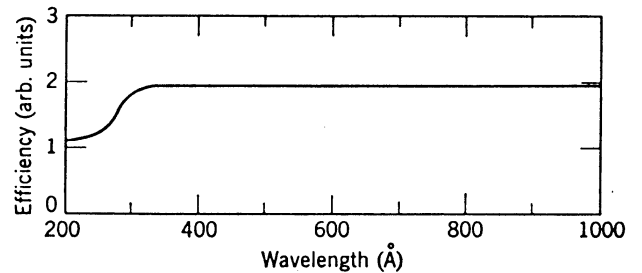
The **Model 654** provides the user with a light tight housing for mounting 1 1/8" (28 mm) side-on type PMT's. The housing is equipped with RF shielding and has connectors for current output and HV input. Some models are equipped for VUV operation. All 654 assemblies are provided with a socket for a specified tube. Tubes are specified separately. (See Table 1 below.)

Choose between **Model 654** for either **atmospheric or vacuum** use. Vacuum versions have scintillator equipped vacuum flanges for detection in the 30 - 300 nm region.

**MODEL 654 — VACUUM UV SIDE-ON PHOTOMULTIPLIER TUBE (PMT) ASSEMBLY**

With the addition of a scintillation flange, the same PMT assembly can be used for many VUV applications. Ultraviolet radiation leaving the exit slit of the spectrometer passes directly to a sodium salicylate coated, vacuum tight window. The scintillator converts the impinging vacuum UV radiation to a VIS emission at about 420 nm. A conventional PMT is used to detect this secondary emission. The scintillator permits use over a broad wavelength range — about 30 nm to the VIS-NIR cut off of the PMT in use.

Response in the 30 - 340 nm region is linear. The absolute quantum efficiency of sodium salicylate between 40 - 340 nm is approximately 65%. The chart below shows the relative quantum efficiency between 20 and 100 nm.



Part No.	Description
8105-0654-0	<b>Model 654 Atmospheric use</b> - for 1 1/8" PMT's. Requires selection of PMT, see chart below.
8105-0654-1	<b>Model 654 Vacuum use.</b> Provided with a scintillator coated window for use in the vacuum UV (300 Å - 2000 Å). Requires selection of PMT, see Table 1 below.
8446-1003-0	<b>Replacement Sodium Salicylate coated window</b> for Model 654 detector assembly.

**Table 1: Model 654 Photomultiplier Tubes (PMTs)**

Type	Range (nm)	Peak, nm Response	Max. Vdc Anode to Cathode	Typ. Sensitivity (uA/lm)	Typ. Current Amplification	Rise Time	Transit Time
1P21	300 - 650	400	1250	40	3.0 x 10 <sup>6</sup>	2.2 ns	22 ns
1P28	185 - 650	340	1250	40	4.8 x 10 <sup>5</sup>	2.2 ns	22 ns
R406	400 - 1100	730	1500	20	2.0 x 10 <sup>5</sup>	2.0 ns	22 ns
R928	185 - 930	400	1250	250	1.0 x 10 <sup>7</sup>	2.2 ns	22 ns
R955	160 - 900	400	1250	200	1.0 x 10 <sup>7</sup>	2.2 ns	22 ns

## Model 650 and Model 658

## Photomultiplier Tube (PMT) Detectors

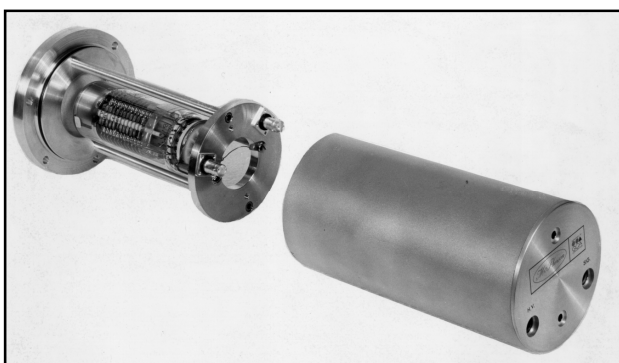
### MODEL 650 & 658 - END-ON PMT ASSEMBLY

The Model 650 provides the user a light tight housing for mounting 2.05" (52 mm) end-on type PMT's. The Model 658 accommodates 1 1/8" (28 mm) end-on tubes. All end-on PMT assemblies are provided with a socket for a specified tube, tubes are specified separately.

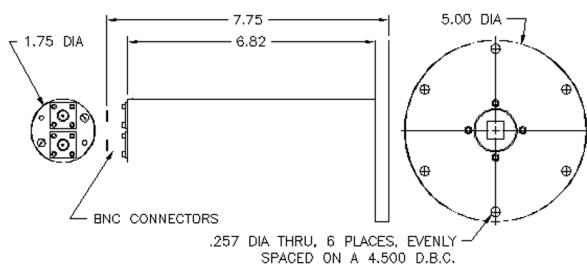
Choose between either atmospheric OR vacuum versions. Vacuum versions have scintillator equipped vacuum flanges for detection in the 30 - 340 nm region. The 9635QB and R268 end-on tubes are the best tubes (\*) to use with sodium salicylate scintillation and feature > 25% QE at the ~ 420 nm emission wavelength.

**Table 1: Models 650 and 658 Photomultiplier Tubes (PMTs)**

Tube	Range (nm)	Peak, nm Response	Max. Vdc Anode to Cathode	Typ. Sensitivity (uA/lm)	Typ. Current Amplification	Rise Time	Transit Time
9235QB	185 - 650	400*	1600	80	$0.9 \times 10^6$	10	70
9558QB	185 - 900	280	1500	230	$25 \times 10^6$	10	65
R268	300 - 650	420*	1500	95	$2.1 \times 10^6$	12	60



*Model 650 End-On PMT Assembly  
for 2.05" Diameter PMTs*



*Model 658 End-On PMT Assembly  
for 1 1/8" Diameter PMTs*

Part No.	Description
8105-0650-0*	<b>Model 650 Vacuum use</b> - includes 9235QB PMT and scintillator. Operates from < 30 nm - 650 nm.
8105-0650-2	<b>Model 650 Vacuum use</b> - includes 9558QB PMT and scintillator. Operates from < 30 nm to 900 nm.
8105-0650-3	<b>Model 650 Vacuum use</b> - modified to seal MgF <sub>2</sub> window or solar blind tubes to vacuum system, maximum end-on diameter of 2.05". Requires selection of PMT, see Table 1 above.
8105-0658-0	<b>Model 658 Atmospheric use</b> - for 1 1/8" end-on tubes. Requires selection of PMT, see chart.
8105-0658-1*	<b>Model 658 Vacuum use.</b> Provided with a scintillator coated window for use in the vacuum UV (< 30 - 340 nm). Requires selection of PMT, see chart.
8446-1002-0	<b>Replacement Sodium Salicylate coated window</b> for Model 650 or 658 detector assembly. Specify when ordering.

\* Indicates best choices for scintillated detectors.