

Thesis Title            A Study on the Design and Construction of Power  
Measuring Instruments for Ultrasound Therapy and  
Short-wave Diathermy Equipment used in Physical  
Therapy.

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Degree                  Master of Science ( Biomedical Instrumentation ).

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#### ABSTRACT.

Therapeutic ultrasound and shortwave diathermy are the devices widely used in physical therapy for direct patients treatment. The actual values of the power output of these devices are the important in the effectiveness and safty of the patients.

From the literatures so far reviewed, the power measuring instruments for ultrasound therapy and shortwave diathermy had not been performed in Thailand before. Therefore, research on the design and construction of power measuring instruments for therapeutic ultrasound and shortwave diathermy are done.

The power measuring instrument for ultrasound therapy was constructed based on the concept of radiation force balance. The test

tank was designed and constructed by using PVC pipe diameter of 16 cm lined with the rubber thickness of half-inch as absorber and fixed with the stainless steel cone target, and used with the electronic balance having capacity of 3100 grams and readability of 0.01 gram. To compare the performance of the constructed device, commercially available is used the DPM-DT-10 as standard device, the difference of the two did not exceeded 5 %. For this value, the constructed device can be accepted to be used in routine work for measuring the power output of ultrasound therapy instrument for physical therapy.

For the power measuring instrument for shortwave diathermy equipment, the design and construction was based on the Enraf Nonius Dummy Load, which used the concept of the electric field induces the current flow through six electrical bulbs. The light from these bulbs was converted to current by a photoelectric cell and monitor this current on the ammeter. To compared the performance of the constructed device, the commercially available was used Enraf device as standard device, the difference was in the range of 200 - 500 watts and did not exceeded 5 %. For this value, the constructed device can be used in routine work for measuring the power output of shortwave diathermy instrument for physical therapy.

The advantages of these constructed device are simple, low cost, reliable results and portable size.