

Date : 12<sup>th</sup> March 2010.

To,  
MCCIA,  
MCCIA Trade Tower, 5<sup>th</sup> Floor,  
Senapati Bapat Road,  
Pune - 411 016.

**Sub. : Appreciation letter for the Friction Welding Services provided for the development and serial production of Bi-metallic Adaptors and Bi-metallic Flanges for BRAHMOS.**

Dear Sir,

We wish to inform you that Mr. Yatin Tambe of FWT (Friction Welding Technologies Pvt. Ltd.), Pune had successfully developed Friction Welding process for welding of Bi-metallic Adaptors and Flanges. The materials used were all Russian grade materials which are 1201 or AMr6 (Aluminum Alloy) to AD1 (Pure Aluminum) to 12X18H10T(SS).

Since these components are being used in BRAHMOS (our Supersonic Missile), the quality requirements of this friction weld were very stringent as the application is very very critical.

The Friction Weld has to pass the flower test of individual metal combinations and then the all three metals combined. Once the flower tests are satisfactory for 90 degree bends more samples are tested for tensile strength. The strength observed was 30% higher than the required values (Required tensile load values were 6.5 kgf/mm<sup>2</sup> and observed values were 9.4 kgf/mm<sup>2</sup> and 8.87 kgf/mm<sup>2</sup>). All the welded components were subjected to helium leak test, high pressure test and vibration tests after machining. We have found zero rejection for friction welding.

Mr. Yatin Tambe of FWT, Pune is the pioneer in the field and has thorough knowledge of the process. FWT has designed and developed their own customized controller for Friction Welding Machines. The interface is very user friendly and it not only monitors and controls all the process parameters but also stores the actual process parameters for each and every job that is welded on the FWT Machine. This facility helped us to gain the confidence about the process capability of the friction welding.

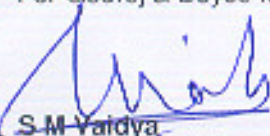
Friction Welding of Bi-metallic Flanges was a big challenge as the tonnage capacity of the existing FWT machine was not enough for welding desired cross section area. Mr. Yatin Tambe has used all his skills & experience and even modified the machine software to get the desired results. He has successfully developed this process of friction welding to suit stringent quality requirements of DNDL.

Friction Welding being a specialized field there are no such services available in India. We thank Mr. Yatin and his FWT team for his valuable contribution towards the development of BRAHMOS missile.

We are happy to that Mr. Yatin Tambe is applying for the prestigious G. S. Parkhe Merit Award 2010 and we feel he deserves the same. We wish him good luck.

Thanking you,

For Godrej & Boyce Mfg. Co. Ltd., Aerospace Division.



S.M. Yaidya

Vice President & Business Head - Precision Systems Division

