1.0 SCOPE

This Specification covers the technical requirements for manufacture, inspection, testing and supply of Inconel-X-750 Compression Springs as further specified below:

2.0 APPLICABLE SPECIFICATIONS AND DRAWINGS

The following specifications of issue in effect on the date of the pertinent Tendering Documents shall form a part of this specification to the extent specified herein. In the event that certain provisions of the specifications listed below conflict with those of this specification the provisions of this specification shall govern:

2.1 Specifications

2.1.1 AMS 5699F – ALLOY WIRE CORROSION AND HEAT RESISTANT Nickel Base - 15.5 Cr – 7Fe – 2.3 Ti – 1 (Cb + Ta) - 0.7 Al Spring Temper (Inconel X 750)

2.1.2 Spring Material – Data sheet code 4.1.4 Issue No.1 dated April 1984 sheet No.1 to 3 from Spring Research Manufacturers Association. (SRMA)

3.0 RAW MATERIAL

The material of all the springs shall be Inconel-X-750 in solution annealed condition and meet the requirements of chemical and mechanical properties are indicated in AMS-5699-F.

4.0 MANUFACTURE

4.1 Spring Manufacture and Heat Treatment:

The springs shall be manufactured in such a manner that they will meet the requirements mentioned in the drawings of FM Heads. Unless otherwise specified on the relevant drawings, the springs shall be manufactured suitable for working at 310°C max. The springs shall be prestressed and aged to condition “Spring Temper” (i.e. age at 650°C for 4 hours and aircool after spring forming) as per spring material – Data sheets of SRMA.

The precipitation hardening heat treatment shall be carried out using a calibrated electrically heated forced air circulation furnace with calibrated thermocouples, compensating cables, temperature controller, temperature recorder etc. to indicate the temperature of the job in the furnace within ±5°C.
5.0 **INSPECTION AND TESTS**

5.1 To check adequacy of heat treatment, UTS values shall be found by testing wire samples placed in the furnace along with springs for heat treatment. The UTS value is required for every size of wire diameter and each lot of springs placed in the furnace at a time.

5.2 Ensure that Pre-stressing has been carried out.

5.3 Ensure that cyclic load test of a sample set of springs has been carried out.

5.3 100% dimensional inspection shall be performed on all dimensions along with spring rate verification to ensure their conformance with the respective drawings.

6.0 **DOCUMENTATION AND CERTIFICATION**

The spring manufacturer shall furnish to the Purchaser three (3) copies of Inspection History Docket covering all aspects of manufacture, inspection and testing such a material test certificates for mechanical and chemical properties in the as drawn and heat treated condition, heat treatment records (time temperature charts), dimensional inspection, pre-stressing, cyclic load test, spring rate verification, certificate of compliance etc. All the documents shall be signed by a responsible technical person of the spring manufacturer.

7.0 **QUALITY SURVEILLANCE:**

The above Inconel X-750 Springs shall be subject to quality control by the supplier. In addition, these materials are subject to quality surveillance by NPC QA. Delivery/Assembly of Inconel X-750 Springs in FM Heads is subject to written clearance from NPC QA.