g. *Sputter Deposition is an overlay coating process based on a momentum transfer phenomenon, wherein positive ions are accelerated by an electric field towards the surface of a target (coating material). The kinetic energy of the impacting ions is sufficient to cause target surface atoms to be released and deposited on an appropriately positioned substrate.*

N.B.

1. *The Table refers only to triode, magnetron or reactive sputter deposition which is used to increase adhesion of the coating and rate of deposition and to radio frequency (RF) augmented sputter deposition used to permit vapourisation of non-metallic coating materials.*
2. *Low-energy ion beams (less than 5 keV) can be used to activate the deposition.*

h. *Ion Implantation is a surface modification coating process in which the element to be alloyed is ionized, accelerated through a potential gradient and implanted into the surface region of the substrate. This includes processes in which ion implantation is performed simultaneously with electron beam physical vapour deposition or sputter deposition.*

Statement of Understanding

It is understood that the following technical information, accompanying the table of deposition techniques, is for use as appropriate.

1. *Technology for pretreatments of the substrates listed in the Table, as follows:*
    - a. *Chemical stripping and cleaning bath cycle parameters, as follows:*
        1. *Bath composition*
            - a. *For the removal of old or defective coatings, corrosion product or foreign deposits;*
            - b. *For preparation of virgin substrates;*
        2. *Time in bath;*
        3. *Temperature of bath;*
        4. *Number and sequences of wash cycles;*
    - b. *Visual and macroscopic criteria for acceptance of the cleaned part;*
    - c. *Heat treatment cycle parameters, as follows:*
        1. *Atmosphere parameters, as follows:*
            - a. *Composition of the atmosphere;*
            - b. *Pressure of the atmosphere;*
        2. *Temperature for heat treatment;*
        3. *Time of heat treatment;*
    - d. *Substrate surface preparation parameters, as follows:*
        1. *Grit blasting parameters, as follows:*
            - a. *Grit composition;*
            - b. *Grit size and shape;*
            - c. *Grit velocity;*
        2. *Time and sequence of cleaning cycle after grit blast;*
        3. *Surface finish parameters;*
    - e. *Masking technique parameters, as follows:*
        1. *Material of mask;*
        2. *Location of mask;*
2. *Technology for in situ quality assurance techniques for evaluation of the coating processes listed in the Table, as follows:*
    - a. *Atmosphere parameters, as follows:*
        1. *Composition of the atmosphere;*
        2. *Pressure of the atmosphere;*
    - b. *Time parameters;*
    - c. *Temperature parameters;*
    - d. *Thickness parameters;*
    - e. *Index of refraction parameters;*
3. *Technology for post deposition treatments of the coated substrates listed in the Table, as follows:*
    - a. *Shot peening parameters, as follows:*
        1. *Shot composition;*
        2. *Shot size;*
        3. *Shot velocity;*
    - b. *Post shot peening cleaning parameters;*
    - c. *Heat treatment cycle parameters, as follows:*
        1. *Atmosphere parameters, as follows:*
            - a. *Composition of the atmosphere;*
            - b. *Pressure of the atmosphere;*
        2. *Time-temperature cycles;*
    - d. *Post heat treatment visual and macroscopic criteria for acceptance of the coated substrates;*
4. *Technology for quality assurance techniques for the evaluation of the coated substrates listed in the Table, as follows:*
    - a. *Statistical sampling criteria;*
    - b. *Microscopic criteria for:*
        1. *Magnification;*
        2. *Coating thickness uniformity;*
        3. *Coating integrity;*
        4. *Coating composition;*
        5. *Coating and substrates bonding;*
        6. *Microstructural uniformity.*
    - c. *Criteria for optical properties assessment:*
        1. *Reflectance;*
        2. *Transmission;*
        3. *Absorption;*
        4. *Scatter;*
5. *Technology and parameters related to specific coating and surface modification processes listed in the Table, as follows:*
    - a. *For Chemical Vapour Deposition:*
        1. *Coating source composition and formulation;*
        2. *Carrier gas composition;*
        3. *Substrate temperature;*
        4. *Time-temperature-pressure cycles;*
        5. *Gas control and part manipulation;*
    - b. *For Thermal Evaporation - Physical Vapour Deposition:*
        1. *Ingot or coating material source composition;*
        2. *Substrate temperature;*
        3. *Reactive gas composition;*
        4. *Ingot feed rate or material vaporisation rate;*
        5. *Time-temperature-pressure cycles;*
        6. *Beam and part manipulation;*
        7. *"Laser" parameters, as follows:*
            - a. *Wave length;*
            - b. *Power density;*
            - c. *Pulse length;*
            - d. *Repetition ratio;*
            - e. *Source;*
            - f. *Substrate orientation;*
    - c. *For Pack Cementation:*
        1. *Pack composition and formulation;*
        2. *Carrier gas composition;*
        3. *Time-temperature-pressure cycles;*
    - d. *For Plasma Spraying:*
        1. *Powder composition, preparation and size distributions;*
        2. *Feed gas composition and parameters;*
        3. *Substrate temperature;*
        4. *Gun power parameters;*
        5. *Spray distance;*
        6. *Spray angle;*
        7. *Cover gas composition, pressure and flow rates;*
        8. *Gun control and part manipulation;*
    - e. *For Sputter Deposition:*
        1. *Target composition and fabrication;*
        2. *Geometrical positioning of part and target;*
        3. *Reactive gas composition;*
        4. *Electrical bias;*
        5. *Time-temperature-pressure cycles;*
        6. *Triode power;*
        7. *Part manipulation;*
    - f. *For ion Implantation:*
        1. *Beam control and part manipulation;*
        2. *Ion source design details;*
        3. *Control techniques for ion beam and deposition rate parameters;*
        4. *Time-temperature-pressure cycles.*
    - g. *For Ion Plating:*
        1. *Beam control and part manipulation;*
        2. *Ion source design details;*
        3. *Control techniques for ion beam and deposition rate parameters;*
        4. *Time-temperature-pressure cycles;*
        5. *Coating material feed rate and vaporisation rate;*
        6. *Substrate temperature;*
        7. *Substrate bias parameters.*