Explanation and Comparison Table of Changes - Guidelines for Nuclear Transfers and the Annex of the Guidelines for Nuclear Transfers (INFCIRC/254/Part 2)

Revision 12	July 2024 Update	Reason for Amendment
5.B.5. Specialised instrumentation for hydrodynamic experiments 5.B.5. Specialised instrumentation for hydrodynamic experiments, as follows: a. Velocity interferometers for measuring velocities exceeding 1 km/s during time intervals of less than 10 μs; b. Shock pressure gauges capable of measuring pressures greater than 10 GPa, including gauges made with manganin, ytterbium, and polyvinylidene fluoride (PVDF) / polyvinyl difluoride (PVF_2); c. Quartz pressure transducers for pressures greater than 10 GPa. Note: Item 5.B.5.a. includes velocity interferometers such as VISARs (Velocity Interferometer Systems for Any Reflector), DLIs (Doppler Laser Interferometers) and PDV (Photonic Doppler Velocimeters) also known as Het-V (Heterodyne Velocimeters).	*5.B.5. Specialised instrumentation for hydrodynamic experiments* 5.B.5. Specialised instrumentation for hydrodynamic experiments, as follows: a. Velocity interferometers for measuring velocities exceeding 1 km/s during time intervals of less than 10 μs; b. Shock pressure gauges capable of measuring pressures greater than 10 GPa, including gauges made with manganin, ytterbium, and polyvinylidene fluoride (PVDF) / polyvinyl difluoride (PVF_2); c. Quartz pressure transducers for pressures greater than 10 GPa. Note: Item 5.B.5.a. includes velocity interferometers **(**such as VISARs (Velocity Interferometer Systems for Any Reflector), DLIs (Doppler Laser Interferometers)**,** ~~and~~ PDV (Photonic Doppler Velocimeters) also known as Het-V (Heterodyne Velocimeters) **and microwave velocity interferometers**	This amendment clarifies that microwave velocity interferometers are to be controlled by the velocity interferometer entry in 5.B.5.a. It eliminates a possible control loophole that may allow proliferators access to system and techniques suitable for carrying out hydrodynamic experiments for weapons applications.

	including optic-microwave mixing velocimeters.	
Revision 12	**July 2023 Update**	**Reason for Amendment**
2.A.2. Platinised catalysts 2.A.2. Platinised catalysts specially designed or prepared for promoting the hydrogen isotope exchange reaction between hydrogen and water for the recovery of tritium from heavy water or for the production of heavy water.	*2.A.2. Platinised catalysts* 2.A.2. **Wet-proofed** ~~P~~**p**latinised catalysts specially designed or prepared for promoting the hydrogen isotope exchange reaction between hydrogen and water for the recovery of tritium from ~~heavy~~ water or for the production **or upgrading** of heavy water. ***Technical Note: In heavy water moderated reactors, upgraders maintain the heavy water concentration in the reactor core. Wet-proofed platinised catalysts can also be used to upgrade heavy water.***	This amendment captures tritium removal from both water and heavy water (upgraders) and clarifies that the controlled platinized catalysts are wet-proofed. These changes reduce the scope of the control and only captures platinised catalysts used in hydrogen isotope exchange reactions for the recovery of tritium and for the production or upgrading of heavy water.
2.A.3. Composite Structures in the Form of Tubes 2.A.3. Composite structures in the form of tubes having both of the following characteristics: a. An inside diameter of between 75 and 400 mm; and b. Made with any of the "fibrous or filamentary materials" specified in	*2.A.3. Composite Structures in the Form of Tubes* 2.A.3. Composite structures in the form of **thin-walled** tubes having ~~both~~ **all** of the following characteristics: a. An inside diameter of between 75 and ~~400~~ **650** mm; ~~and~~ **b. A thickness of 12 mm or less; and**	This amendment increases the range of diameters of composite structures in the form of tubes to be consistent with changes made during the Dedicated Meeting of Technical Experts (DMTE) (2010-2013) and during the 2022 Plenary. As a result of a complete revision of both NSG lists in

Item 2.C.7.a. or carbon prepreg materials specified in Item 2.C.7.c.	~~b.~~ **c.** Made with any of the "fibrous or filamentary materials" specified in Item 2.C.7.a. or carbon prepreg materials specified in Item 2.C.7.c.	2010-2013, completed by the DMTE, the maximum diameter of gas centrifuges was changed from 400 mm to 650 mm in Sections 5.1, 5.1.1 of Annex B of the Part 1 Guidelines. This amendment ensures the coverage of composite structures in the form of tube that can be for gas centrifuge rotors are harmonized with the control parameters of the centrifuges. In addition, a new thickness parameter of 12 mm has also been added to only control thin-walled tubes.
4.B.2 Hydrogen-cryogenic distillation columns 4.B.2. Hydrogen-cryogenic distillation columns having all of the following characteristics: a. Designed for operation at internal temperatures of 35 K (-238 ºC) or less; b. Designed for operation at internal pressures of 0.5 to 5 MPa; c. Constructed of either: 1. Stainless steel of the Society of Automotive Engineers International (SAE) 300 series with low sulphur content and with	*4.B.2 Hydrogen-cryogenic distillation columns* 4.B.2. Hydrogen-cryogenic distillation columns having all of the following characteristics: a. Designed for operation at internal temperatures ~~of~~ **in the range** of **15 K (-258ºC) to** 35 K (-238 ºC) ~~or less~~; b. Designed for operation at internal pressures **in the range** of ~~0.5 to 5~~ **0.1 MPa to 1** MPa; c. Constructed of either: 1. **Austenitic** ~~S~~**s**tainless steel ~~of the Society of Automotive Engineers~~	This amendment was made to account for new heavy water production techniques and to update some control parameters. Specifically, the new text amends the outlet temperatures and the internal pressure range along with clarifying the materials of construction. Additionally, a new technical note 2 was added to provide examples of equivalent materials of construction that are both cryogenic and hydrogen compatible within the updated temperature range.

an austenitic ASTM (or equivalent standard) grain size number of 5 or greater; or 2. Equivalent materials which are both cryogenic and hydrogen (H_2)-compatible; and d. With internal diameters of 30 cm or greater and 'effective lengths' of 4 m or greater. *Technical Note:* *The term 'effective length' means the active height of packing material in a packed-type column, or the active height of internal contactor plates in a plate-type column.*	~~International (SAE) 300 series with low sulphur content and with an austenitic ASTM (or equivalent standard) grain size number of 5 or greater~~; or 2. Equivalent materials which are both cryogenic and hydrogen (H_2)-compatible **between 15 K (-258ºC) and 35 K (-238ºC)**; and d. With internal diameters of 30 cm or greater and 'effective lengths' of 4 m or greater. *Technical Note **1**: The term 'effective length' means the active height of packing material in a packed-type column, or the active height of internal contactor plates in a plate-type column.* ***Technical Note 2: Equivalent materials could include, but are not limited to the following materials:*** ***a. aluminium,*** ***b. aluminium alloys,*** ***c. copper alloys,*** ***d. nickel alloys, and*** ***e. titanium alloys.***	