This table presents the uses identified by PMRC member companies and their downstream customers for Palladium and Palladium compounds. As far as possible the uses have been grouped, and the use descriptors collated. All use descriptors provided have been included at this stage, except those that are incompatible with use as an intermediate (see footnotes 1 - 4). When the use was stated to be an intermediate or processing aid, no subsequent service life has been included, as the substance will be consumed in these processes or will not form part of the article. However, for other uses, services lives have been assumed, although often no information has been provided for these.

	Use	**SU**	**PROCs**	**ERCs**
Ammonium hexachloropalladate	Intermediate - Industrial[1,2,4]	8, 9	3, 9, 22, 27a	6a
Dichlorobistriphenylphosphine Palladium	Intermediate - Industrial[1,2]	3	8b, 9	1, 6a
	Catalyst - Industrial	3, 8, 9, 24	1, 9, 15	1, 4, 5
Dihydrogen tetrachloropalladate	Intermediate - Industrial[1,2,3,4]	3, 8, 9, 10, 14	1, 3, 4, 8a, 8b, 9, 15, 27b	1, 2, 6a
	Intermediate - Professional[1,2,3,4]	3, 9, 14	1, 3, 8b, 15, 27b	1, 2, 6a
	Metal surface treatment – Industrial	3, 10	4, 8b, 9, 13, 19	2, 4, 5
Dipotassium hexachloropalladate	Intermediate - Industrial[1,2]	3	4, 8a, 8b, 9, 26	1, 6a
Disodium tetrachloropalladate	Intermediate - Industrial[1,2]	3, 8, 9	1, 3, 4, 8b, 9	1, 6a
Palladium (II) diacetate	Intermediate - Industrial	3, 9	1, 3, 5, 8b, 9	1, 6a
	Catalyst - Industrial	3, 8, 9, 24	1, 4, 8b, 9, 15	1, 4, 5
	Reactive processing aid - Industrial	3, 9, 24	3, 8b	6b
Palladium diammine dichloride	Intermediate - Industrial[1,2, 4]	3, 8, 9, 10, 14	3, 4, 8a, 8b, 9, 15, 26	1, 2, 6a
	Electroplating or metal surface treatment- Industrial	3, 15, 16	4, 5, 8b, 13, 26, 0 (Cleaning)	5, 6a
Palladium	Intermediate - Industrial[1,2,3, 4]	3, 8, 9, 10, 14	1, 3, 4, 5, 8b, 9, 14, 15, 21, 24, 26	1, 6a

	Use	SU	PROCs	ERCs
	Production and use of Pd metal containing catalyst - Industrial	3, 9, 10, 0 (Pharmaceutical industry / catalytic converters for engines)	1, 2, 3, 4, 8a, 8b, 9, 13, 14, 15, 27a	1, 3, 4, 6a
	Metal Surface treatment - Industrial	3, 15, 24	2, 8b, 13, 20, 26, 0 (cleaning)	2, 5
	Reforming of Pd - Industrial	3, 14, 15, 16, 17, 20, 21, 24, 0 (precious metals production / Banks / C32.1.2 - Manufacture of jewellery and related articles)	1, 3, 4, 5, 6, 8a, 8b, 9, 10, 13, 14, 19, 21, 22, 23, 24, 25, 26, 27a, 27b, 0 (melting process / printing)	1, 2, 3, 4, 5, 7, 8c, 11a, 12a, 0 (development of semifinished products)
	Reforming of Pd - Professional	3, 14, 15, 16, 17, 21, 22, 24, 0 (C32.1.2 - Manufacture of jewellery and related articles)	1, 4, 5, 6, 8a, 8b, 9, 10, 13, 19, 22, 24, 25, 26, 0 (melting process / printing)	1, 2, 3, 4, 5, 7, 8a, 8c, 8d, 10b, 11a, 12a

	Use	SU	PROCs	ERCs
	Manufacture of Pd containing alloys - Industrial	2a, 3, 14, 15, 16, 17, 20, 21, 22, 0 (precious metals production / jewellery use)	1, 3, 4, 5, 6, 8a, 8b, 9, 13, 14, 22, 23, 24, 25, 26, 0 (Alloy(ing) / mechanical development of semifinished products)	1, 2, 3, 6a, 8a, 8d, 10b, 11a, 12a, 0 (development of semifinished products)
	Manufacture of Pd containing alloys - Professional	3, 15, 22	1, 5, 22, 24, 26	1, 2
	Handling and use of Pd containing materials - Industrial	*No relevant use descriptors supplied. However, uses in Trading, Surface treated materials, Technical Products, Precious metal products, Coins, Medals, Electronics, Dental alloys and Jewellery were indicated*		
	Handling and use of Pd containing materials - Professional			
	Handling and use of Pd containing materials - Consumer			
Palladium (II) di(4-oxopent-2-en-2oate)	Intermediate - Industrial[1,2]	3, 9	3, 4, 8b, 9	1
	Catalyst - Industrial	3, 8, 9, 24	1, 9, 15	1, 4, 5
Palladium chloride	Intermediate - Industrial[1,2,4]	3, 8, 9, 10, 13	1, 2, 3, 4, 8b, 9, 15, 26	1, 2, 6a
	Catalyst - Industrial	8, 10, 0	1, 3, 15	1, 4, 5, 6a, 7
	Metal Surface Treatment - Industrial	3, 4, 10, 11, 14, 15, 16, 17, 23	2, 3, 4, 5, 7, 8a, 8b, 9, 13, 15, 19, 26, 0 (cleaning)	2, 4, 5, 7
	Metal Surface Treatment - Professional	3, 10, 16	2, 4, 5, 8b, 9, 13, 15, 26	2, 5, 7
	Non-metal surface treatment - Industrial	3, 10, 16	1, 2, 3, 4, 5, 7, 8b, 9, 13, 15, 19,	2, 5, 6a, 6b, 7

	Use	SU	PROCs	ERCs
			26	
	Manufacture of Inks and paints - Industrial	3, 9, 16, 24	4, 9, 15, 26, 27b	1, 2, 5, 6a
	Use of Inks and paints - Industrial	Confirmed use, but use descriptors not provided		
	Use of Inks and paints - Consumer	Confirmed use, but use descriptors not provided		
Palladium dinitrate	Intermediate - Industrial[1,2,3,4]	3, 8, 9, 14	1, 3, 4, 5, 8a, 8b, 9, 15, 21, 27b	1, 2, 6a
	Intermediate - Professional[1,2,3,4]	3, 9, 14	1, 3, 8b, 15, 27b	1, 2, 6a
	Manufacture of Pd dinitrate containing catalysts - Industrial	3, 8, 9, 16, 17, 0	2, 3, 4, 5, 8a, 8b, 9, 13, 19, 22, 0 (Cleaning)	2, 5, 8a
	Use of Pd dinitrate containing catalyst - Industrial/Professional/Consumer	*Implied use*		
Palladium sulphate	Intermediate - Industrial[1,2]	3, 9, 10	2, 3, 4, 8b, 9, 15, 26	1, 2, 6a
	Used in galvanation or metal surface treatment - Industrial	3, 10, 15	2, 4, 8b, 9, 13, 19, 26	2, 4, 5
Palladium Hydroxide	Intermediate - Industrial[1,2,3]	3	3, 4, 5, 8b, 9, 21	2, 6a
Palladium Oxide	Intermediate - Industrial[1,2,4]	3	4, 5, 8b, 9	1, 2, 6a
	Manufacture of Pd oxide containing catalyst - Industrial	3	1, 2, 4, 5, 8b, 9, 13, 21,	2, 5, 11a
	Use of Pd oxide containing catalyst – Industrial/Professional/Consumer	*Implied use*		

	Use	SU	PROCs	ERCs
Tetraammine Palladium diacetate	Intermediate - Industrial[1,2,4]	3, 8, 9	1, 3, 4, 8b, 9, 15, 0 (Decomposing of compound by calcinating process)	1, 2, 6a
Tetraammine Palladium dichloride	Intermediate - Industrial[1,2,3,4]	3, 8, 9, 10	2, 3, 4, 5, 8a, 8b, 9, 15, 19, 26, 27b	1, 2, 6a
	Metal Surface Treatment - Industrial	3, 10, 15	2, 4, 8b, 9, 13, 19, 26, 27b, 0 (Rinsing), 0 (Cleaning)	2, 4, 5
	Metal Surface Treatment - Professional	3,15	8b, 13, 26, 27b, 0 (rinsing)	5
Tetrammine palladium dihydroxide	Intermediate - Industrial[1,2]	3, 9	4, 8b, 9	1, 6a
Tetraammine palladium dinitrate	Intermediate - Industrial[1,2,3,4]	3, 8, 9	1, 3, 4, 8b, 9, 15, 0 (Decomposing of compound by calcinating process)	1, 2, 6a
Tetrakis(triphenylphosphine) palladium	Intermediate - Industrial[1,2,3]	3, 9	1, 3, 8b, 9	1, 2, 6a
	Use as a catalyst - Industrial	3, 8, 9, 24	1, 3, 8a, 9, 15	1, 4, 5

Key;

	Some companies provided a single set of descriptors, but noted both industrial and professional use. Companies were asked to complete separate responses for both professional and industrial use. However, updated questionnaires were not received. Therefore, the PROCs, ERCs and SU codes provided are applied to both categories.
[1]	ECHA has indicated that the following PROC codes are compatible with intermediate uses only if the registrant explains that they apply only to pre or

	post-transformation steps: - PROC 6 Calendering operations - PROC 7 Industrial spraying - PROC 14 Production of preparations or articles by tabletting, compression, extrusion, pelletisation - PROC 19 Hand-mixing with intimate contact and only PPE available - PROC 21Low energy manipulation of substances bound in materials and/or articles - PROC 24 High (mechanical) energy workup of substances bound in materials and/or articles Additionally the following PROC codes are <u>incompatible</u> with all intermediate uses; - PROC 10 Roller application or brushing - PROC 11 Non industrial spraying - PROC 12 Use of blowing agents in manufacture of foam - PROC 13 Treatment of articles by dipping and pouring - PROC 16 Using material as fuel sources, limited exposure to unburned product to be expected - PROC 17 Lubrication at high energy conditions and in partly open process - PROC 18 Greasing at high energy conditions - PROC 20 Heat and pressure transfer fluids in dispersive, professional use but closed systems - PROC 23 Open processing and transfer operations with minerals/metals at elevated temperature - PROC 25 Other hot work operations with metals Where these incompatible PROC codes were reported in the returned questionnaire for Intermediate use, they have been removed.
[2]	ECHA has indicated the PROCs they consider as incompatible with registration as an intermediate under SCC. They are; - PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises - PROC 5 Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant contact) - PROC 16 Using material as fuel sources, limited exposure to unburned product to be expected - PROC 17 Lubrication at high energy conditions and in partly open process - PROC 23 Open processing and transfer operations with minerals/metals at elevated temperature Additionally the following PROCs are only applicable for registering as an intermediate under SCC with the addition of a clarification statement on how rigorous containment is maintained in Appendix 3: - PROC 8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. - PROC 22 Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting - PROC 24 High (mechanical) energy workup of substances bound in materials and/or articles - PROC 26 Handling of solid inorganic substances at ambient temperature

	- PROC 27a Production of metal powders (hot processes) - PROC 27b Production of metal powders (wet processes) We have not been provided with information on whether an identified intermediate use is being registered under SCC or not. Therefore, companies registering compounds as having an intermediate use under SCC should ensure that only acceptable PROC codes have been assigned and that appropriate justification is included in their dossier.
3	ECHA has indicated that the following ERC codes are <u>incompatible</u> with intermediate uses: - ERC 3 Formulation in materials - ERC 4 Industrial use of processing aids in processes and products, not becoming part of articles - ERC 5 Industrial use resulting in inclusion into or onto a matrix - ERC 6b Industrial use of reactive processing aids - ERC 6c Industrial use of monomers for manufacture of thermo-plastics - ERC 7 Industrial use of substances in closed systems - ERC 8a Wide dispersive indoor use of processing aids in open systems - ERC 8b Wide dispersive indoor use of reactive substances in open systems - ERC 8c Wide dispersive indoor use resulting in inclusion into or onto a matrix - ERC 8d Wide dispersive outdoor use of processing aids in open systems - ERC 8e Wide dispersive outdoor use of reactive substance in open systems -ERC 8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix - ERC 9a Wide dispersive indoor use of substances in closed systems - ERC 9b Wide dispersive outdoor use of substances in closed systems - ERC 10a Wide dispersive outdoor use of long-life articles and materials with low release - ERC 10b Wide dispersive outdoor use of long-life articles and materials with high or intended release (including abrasive processing) -ERC 11a Wide dispersive indoor use of long-life articles and materials with low release - ERC 11b Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing) - ERC 12a Industrial processing of articles with abrasive techniques (low release) - ERC 12b Industrial processing of articles with abrasive techniques (high release) Where these incompatible ERC codes were reported in the returned questionnaire for Intermediate use they have been removed.
4	The following SU codes have been deemed <u>acceptable</u> by ECHA for intermediate uses; - SU 9 Manufacture of fine chemicals - SU 10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys) - SU 14 Manufacture of basic metals, including alloys

	SU 3 Industrial uses is now obsolete in IUCLID, as this SU is implicit when reporting an industrial use. However, it can remain in (non-IUCLID) listings to identify the main user group (and can be consistent with intermediate status). In addition, Eurométaux will discuss with ECHA whether the following SU codes may also be consistent with intermediate uses; - SU 8 Manufacture of bulk, large scale chemicals (including petroleum products) - SU 13 Manufacture of other non-metallic mineral products, e.g. plasters, cement Furthermore, it is recommended to replace SU 15 by SU 14 where possible for intermediate uses. Where other incompatible SU codes have been reported in the returned questionnaire for intermediate use they have been removed.