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ELEMENTAL IMPURITY ASSESSMENT
MATERIAL NAME: HEPES N02 2021

TABLE 1: ELEMENTAL IMPURITY ASSESSMENT	Analytical Method: BSI-ATM-0054, Method Validation Report: BSI-RPT-0544 Manufacturing Process: BSI-PRL-0400 Degradation and Impurity Protocol: BSI-PRL-0436, Report: BSI-RPT-1029 Parenteral Specifications (10g/day MDD)	
Element	**Class**	**[1]Limits 1.0J Target ppm (µg/g)**
Cd	1	0.20
Pb	1	0.50
As	1	1.5
Hg	1	0.30
Co	2A	0.50
V	2A	1.0
Ni	2A	2.0
Tl	2B	0.80
Au	2B	10
Pd	2B	1.0
Ir	2B	1.0
Os	2B	1.0
Rh	2B	1.0
Ru	2B	1.0
Se	2B	8.0
Ag	2B	1.0
Pt	2B	1.0
Li	3	25

TABLE 1: ELEMENTAL IMPURITY ASSESSMENT	Analytical Method: BSI-ATM-0054, Method Validation Report: BSI-RPT-0544 Manufacturing Process: BSI-PRL-0400 Degradation and Impurity Protocol: BSI-PRL-0436, Report: BSI-RPT-1029 Parenteral Specifications (10g/day MDD)	
Element	**Class**	**[1]Limits 1.0J Target ppm (µg/g)**
Sb	3	9.0
Ba	3	70
Mo	3	15
Cu	3	5.0
Sn	3	60
Cr	3	5.0
Fe	4	5.0
Mn	4	5.0
Zn	4	5.0
Ca	4	50
K	4	50
Mg	4	5.0

[1]Limits derived from Analytical Method BSI-ATM-0054

TABLE 2: ELEMENTAL IMPURITY ASSESSMENT				Manufacturing Process: BSI-PRL-0400 Degradation and Impurity Protocol: BSI-PRL-0436, Report: BSI-RPT-1029 Parenteral Specifications (10g/day MDD)		
Element	**Class**	**Limits 1.0J Target ppm (µg/g)**	**Result Lot: HEPE-0121-00154-PV Beginning ppm (µg/g)**	**Result Lot: HEPE-0121-00154-PV Middle ppm (µg/g)**	**Result Lot: HEPE-0121-00154-PV End ppm (µg/g)**	**Result Lot: HEPE-0121-00154-PV Composite ppm (µg/g)**
Cd	1	0.20	<0.06	<0.06	<0.06	<0.06
Pb	1	0.50	<0.15	<0.15	<0.15	<0.15
As	1	1.5	<0.45	<0.45	<0.45	<0.45
Hg	1	0.30	<0.09	<0.09	<0.09	<0.09
Co	2A	0.50	<0.15	<0.15	<0.15	<0.15
V	2A	1.0	<0.30	<0.30	<0.30	<0.30
Ni	2A	2.0	<0.60	<0.60	<0.60	<0.60
Tl	2B	0.80	<0.24	<0.24	<0.24	<0.24
Au	2B	10	<3.0	<3.0	<3.0	<3.0
Pd	2B	1.0	<0.30	<0.30	<0.30	<0.30
Ir	2B	1.0	<0.30	<0.30	<0.30	<0.30
Os	2B	1.0	<0.30	<0.30	<0.30	<0.30
Rh	2B	1.0	<0.30	<0.30	<0.30	<0.30
Ru	2B	1.0	<0.30	<0.30	<0.30	<0.30
Se	2B	8.0	<2.4	<2.4	<2.4	<2.4
Ag	2B	1.0	<0.30	<0.30	<0.30	<0.30
Pt	2B	1.0	<0.30	<0.30	<0.30	<0.30

TABLE 2: ELEMENTAL IMPURITY ASSESSMENT				Manufacturing Process: BSI-PRL-0400 Degradation and Impurity Protocol: BSI-PRL-0436, Report: BSI-RPT-1029 Parenteral Specifications (10g/day MDD)		
Element	**Class**	**Limits 1.0J Target ppm (µg/g)**	**Result Lot: HEPE-0121-00154-PV Beginning ppm (µg/g)**	**Result Lot: HEPE-0121-00154-PV Middle ppm (µg/g)**	**Result Lot: HEPE-0121-00154-PV End ppm (µg/g)**	**Result Lot: HEPE-0121-00154-PV Composite ppm (µg/g)**
Li	3	25	<7.5	<7.5	<7.5	<7.5
Sb	3	9.0	<2.7	<2.7	<2.7	<2.7
Ba	3	70	<21	<21	<21	<21
Mo	3	15	<4.5	<4.5	<4.5	<4.5
Cu	3	5.0	<1.5	<1.5	<1.5	<1.5
Sn	3	60	<18	<18	<18	<18
Cr	3	5.0	<1.5	<1.5	<1.5	<1.5
Fe	4	5.0	<1.5	<1.5	<1.5	<1.5
Mg	4	5.0	<1.5	<1.5	<1.5	<1.5
Mn	4	5.0	<1.5	<1.5	<1.5	<1.5
Zn	4	50	<15	<15	<15	<15
Ca	4	50	<15	<15	<15	<15
K	4	5.0	<1.5	<1.5	<1.5	<1.5

TABLE 3: ELEMENTAL IMPURITY ASSESSMENT			Manufacturing Process: BSI-PRL-0400 Degradation and Impurity Protocol: BSI-PRL-0436, Report: BSI-RPT-1029 Parenteral Specifications (10g/day MDD)		
Element	**Class**	**Limits 1.0J Target ppm (µg/g)**	**Result RM Lot: RMAT-1021-0028 ppm (µg/g)**	**Result RM Lot: RMAT-1021-0030 ppm (µg/g)**	**Result RM Lot: RMAT-1021-0033 ppm (µg/g)**
Cd	1	0.20	<0.06	<0.06	<0.06
Pb	1	0.50	<0.15	<0.15	<0.15
As	1	1.5	<0.45	<0.45	<0.45
Hg	1	0.30	<0.09	<0.09	<0.09
Co	2A	0.50	<0.15	<0.15	<0.15
V	2A	1.0	<0.30	<0.30	<0.30
Ni	2A	2.0	<0.60	<0.60	<0.60
Tl	2B	0.80	<0.24	<0.24	<0.24
Au	2B	10	<3.0	<3.0	<3.0
Pd	2B	1.0	<0.30	<0.30	<0.30
Ir	2B	1.0	<0.30	<0.30	<0.30
Os	2B	1.0	<0.30	<0.30	<0.30
Rh	2B	1.0	<0.30	<0.30	<0.30
Ru	2B	1.0	<0.30	<0.30	<0.30
Se	2B	8.0	<2.4	<2.4	<2.4
Ag	2B	1.0	<0.30	<0.30	<0.30
Pt	2B	1.0	<0.30	<0.30	<0.30

TABLE 3: ELEMENTAL IMPURITY ASSESSMENT			Manufacturing Process: BSI-PRL-0400 Degradation and Impurity Protocol: BSI-PRL-0436, Report: BSI-RPT-1029 Parenteral Specifications (10g/day MDD)		
Element	**Class**	**Limits 1.0J Target ppm (µg/g)**	**Result RM Lot: RMAT-1021-0028 ppm (µg/g)**	**Result RM Lot: RMAT-1021-0030 ppm (µg/g)**	**Result RM Lot: RMAT-1021-0033 ppm (µg/g)**
Li	3	25	<7.5	<7.5	<7.5
Sb	3	9.0	<2.7	<2.7	<2.7
Ba	3	70	<21	<21	<21
Mo	3	15	<4.5	<4.5	<4.5
Cu	3	5.0	<1.5	<1.5	<1.5
Sn	3	60	<18	<18	<18
Cr	3	5.0	<1.5	<1.5	<1.5
Fe	4	5.0	<1.5	<1.5	<1.5
Mg	4	5.0	<1.5	<1.5	<1.5
Mn	4	5.0	<1.5	<1.5	<1.5
Zn	4	50	<15	<15	<15
Ca	4	50	<15	<15	<15
K	4	5.0	<1.5	<1.5	<1.5

TABLE 4: ELEMENTAL IMPURITY ASSESSMENT				Manufacturing Process DCN: BSI-PRL-0400 Degradation and Impurity Protocol: BSI-PRL-0436, Report: BSI-RPT-1029 Parenteral Specifications (10g/day MDD)	
Element	**Class**	**Limits 1.0J Target ppm (µg/g)**	**Result ML Lot: HEPE-0121-00154-PV ML ppm (µg/g)**	**Result WC Lot: HEPE-0121-00154-PV WC Basket #1 ppm (µg/g)**	**Result FG Lot: HEPE-0121-00154-PV FG Drum #1 ppm (µg/g)**
Cd	1	0.20	<0.06	<0.06	<0.06
Pb	1	0.50	<0.15	<0.15	<0.15
As	1	1.5	<0.45	<0.45	<0.45
Hg	1	0.30	<0.09	<0.09	<0.09
Co	2A	0.50	<0.15	<0.15	<0.15
V	2A	1.0	<0.30	<0.30	<0.30
Ni	2A	2.0	<0.60	<0.60	<0.60
Tl	2B	0.80	<0.24	<0.24	<0.24
Au	2B	10	<3.0	<3.0	<3.0
Pd	2B	1.0	<0.30	<0.30	<0.30
Ir	2B	1.0	<0.30	<0.30	<0.30
Os	2B	1.0	<0.30	<0.30	<0.30
Rh	2B	1.0	<0.30	<0.30	<0.30
Ru	2B	1.0	<0.30	<0.30	<0.30
Se	2B	8.0	<2.4	<2.4	<2.4
Ag	2B	1.0	<0.30	<0.30	<0.30
Pt	2B	1.0	<0.30	<0.30	<0.30

TABLE 4: ELEMENTAL IMPURITY ASSESSMENT				Manufacturing Process DCN: BSI-PRL-0400 Degradation and Impurity Protocol: BSI-PRL-0436, Report: BSI-RPT-1029 Parenteral Specifications (10g/day MDD)	
Element	**Class**	**Limits 1.0J Target ppm (µg/g)**	**Result ML Lot: HEPE-0121-00154-PV ML ppm (µg/g)**	**Result WC Lot: HEPE-0121-00154-PV WC Basket #1 ppm (µg/g)**	**Result FG Lot: HEPE-0121-00154-PV FG Drum #1 ppm (µg/g)**
Li	3	25	<7.5	<7.5	<7.5
Sb	3	9.0	<2.7	<2.7	<2.7
Ba	3	70	<21	<21	<21
Mo	3	15	<4.5	<4.5	<4.5
Cu	3	5.0	<1.5	<1.5	<1.5
Sn	3	60	<18	<18	<18
Cr	3	5.0	<1.5	<1.5	<1.5
Fe	4	5.0	<1.5	<1.5	<1.5
Mg	4	5.0	<1.5	<1.5	<1.5
Mn	4	5.0	<1.5	<1.5	<1.5
Zn	4	50	<15	<15	<15
Ca	4	50	<15	<15	<15
K	4	5.0	<1.5	<1.5	<1.5