

Advanced
Engineering

Hitachi Tool

HITACHI
Inspire the Next

MINIATURE

ADVANCED
TH60+
NANO PVD COATING

No. 437

NEW

EPDBE Epoch Deep Ball **Evolution**

For Higher Efficiency & Higher Precision Deep Milling
Micro Grain Solid Carbide End Mill



- $\varnothing D$ 0.1 ~ 6 mm
- l_n 1.5xD ~ 20xD
- 163 Sizes
- Higher cutting performance
- New developed compound neck shape

Carbide End Mills · Nano PVD Coated

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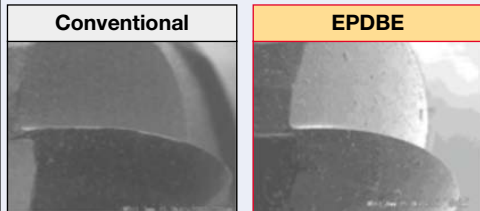
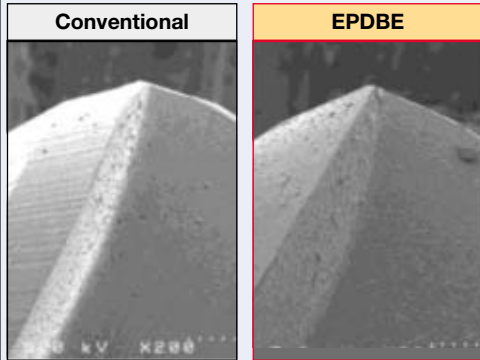
Ultra Micro Grain Solid Carbide End Mill

EPDBE-ATH | Epoch Deep Ball Evolution ATH

The Evolution in Chip Evacuation: Cutting edge geometry with high rigidity and 3D chip pocket for stable cutting especially in rib milling

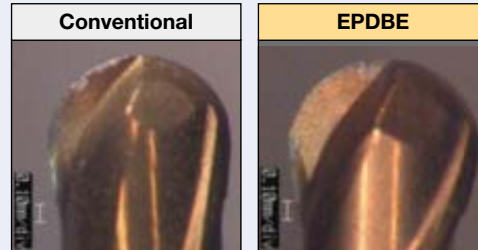
3D chip-pocket geometry

Evolution in rib milling performance: 3D chip-pocket geometry improves chip evacuation, especially in deep rib milling.



Optimized strong cutting edge

Evolution in tool life – optimized strong cutting edge reduces the risk of chipping even in aggressive cutting condition.



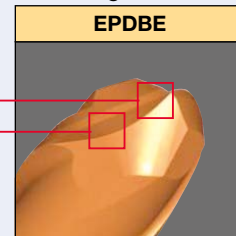
Cutting edge after using

High-curved cutting edge

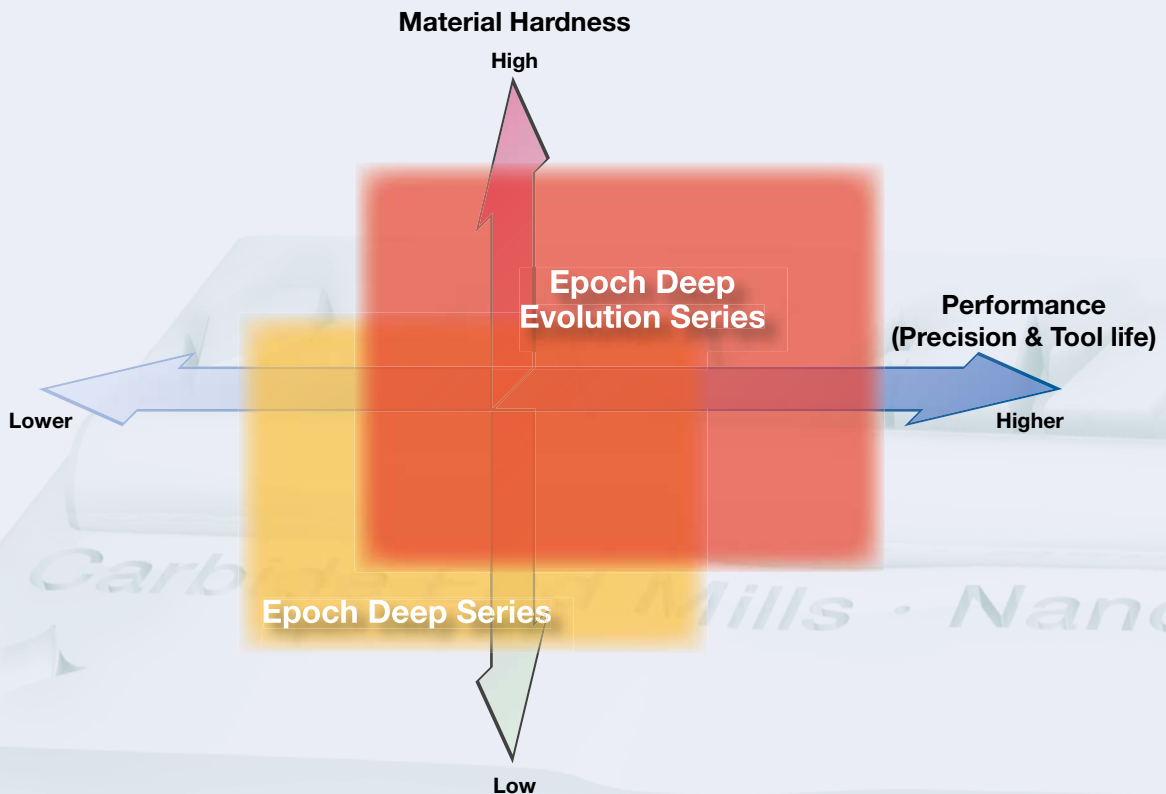
Evolution in finishing accuracy and quality High-curved cutting edge realizes lower cutting force and increase the cutting stability.

3D chip-pocket space

Higher curved cutting edge



Positioning of new Epoch Deep Evolution Series



Ultra Micro Grain Solid Carbide End Mill

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Optimized neck radius
Evolution in higher precision and higher efficiency further improves the conventional neck geometry to resist breakage and suppress deflection.

Conventional Deep Series neck shape	Deep Evolution Series new neck shape
<p>Large neck R range</p>	<p>Smaller neck R range suppresses deflection</p>

Deflection reduced by more than 20%
Static load test results
Testing tool size: $\varnothing D = 1\text{ mm}$, $l_n = 6\text{ mm}$

Deflection amount (mm)	Load (N) - New Neck Shape	Load (N) - Conventional Neck Shape
0.35	61	-
0.36	62	-
0.37	62	-
0.41	-	60
0.43	-	61

Deflection suppression effect is high even under the same load. Enables machining with even higher accuracy.

New ATH (Advanced TH) Coating – Characteristics

- Excellent adhesion strength
- Oxidation temperature: 1200°C
- Coating Hardness: 3800Hv
- Higher temperature resistance and wear resistance

TH Coating

TH Coating (Conventional)

ATH Coating

New ATH Coating for hardened steel (45HRC-65HRC)

High hardness coating
High heat resistant coating
Nano size composite with atomic structure level

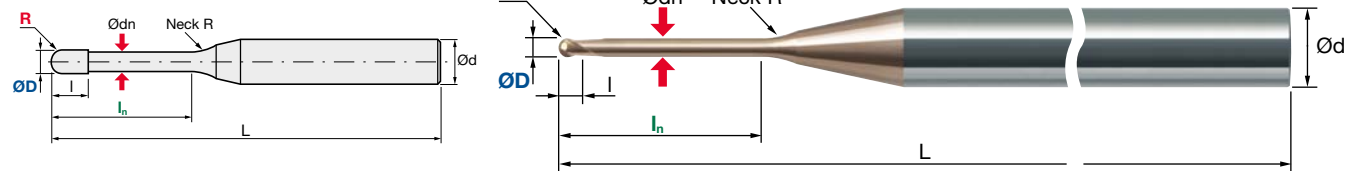
Coating	Coating Hardness (Hv)	Oxidation temp. (°C)
TiAlN	~2800	~800
TH	~3500	~1100
ATH	~3800	~1200

Ultra Micro Grain Solid Carbide End Mill

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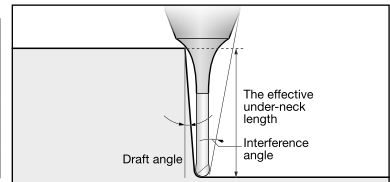
V max High Speed
HRC 70
No. of Teeth 2

A (D0.1–D5.0)



Carbide Micro Grain
TH60+ Nano-PVD Coating
Rake Angle Negative

Helix angle	30°
R 0.05 – 0.25	± 0.003mm
R 0.3 – 3.0	± 0.005mm
D 0.1 – 0.5	(0/-0.006 mm)
D 0.6 – 6.0	(0/-0.010 mm)
Ød	h5



Size										Actual Effective Length in Incline angles					
ID Code	Item Code	Z	ØD	In	l	Ødn	L	Ød	Neck R	0.5°	1°	1.5°	2°	3°	
EP911	EPDBE-2001-0.2-ATH	2	0.1	0.2	0.08	0.08	45		1	0.35	0.37	0.39	0.41	0.44	
EP912	EPDBE-2001-0.3-ATH			0.3						0.46	0.48	0.5	0.52	0.57	
EP913	EPDBE-2001-0.5-ATH			0.5						0.67	0.7	0.73	0.76	0.81	
EP914	EPDBE-2002-0.5-ATH			0.5						0.7	0.72	0.75	0.77	0.82	
EP915	EPDBE-2002-0.75-ATH			0.75						0.96	0.99	1.02	1.05	1.11	
EP916	EPDBE-2002-1-ATH			1						1.22	1.26	1.3	1.33	1.39	
EP917	EPDBE-2002-1.25-ATH		0.2	0.15	1.25	0.17	0.17				1.48	1.52	1.57	1.61	1.72
EP918	EPDBE-2002-1.5-ATH				1.5						1.74	1.79	1.84	1.88	2.05
EP919	EPDBE-2002-2-ATH				2						2.25	2.32	2.37	2.45	2.71
EP920	EPDBE-2002-2.5-ATH				2.5						2.77	2.84	2.91	3.05	3.37
EP921	EPDBE-2002-3-ATH				3						3.28	3.37	3.48	3.65	4.04
EP922	EPDBE-2003-0.5-ATH				0.5						0.78	0.82	0.86	0.9	0.98
EP923	EPDBE-2003-0.75-ATH		0.3	0.25	0.75	0.27	0.27				1.05	1.1	1.15	1.2	1.29
EP924	EPDBE-2003-1-ATH				1						1.31	1.38	1.43	1.49	1.59
EP925	EPDBE-2003-1.25-ATH				1.25						1.58	1.65	1.72	1.78	1.89
EP926	EPDBE-2003-1.5-ATH				1.5						1.84	1.92	1.99	2.06	2.18
EP927	EPDBE-2003-2-ATH				2						2.36	2.46	2.55	2.62	2.76
EP928	EPDBE-2003-2.5-ATH				2.5						2.89	3	3.1	3.18	3.36
EP929	EPDBE-2003-3-ATH	3			3.41				3.53		3.64	3.73	4.02		
EP930	EPDBE-2004-0.75-ATH	0.75			1.04				1.09		1.14	1.19	1.28		
EP931	EPDBE-2004-1-ATH	1			1.31				1.37		1.43	1.48	1.58		
EP932	EPDBE-2004-1.5-ATH	1.5			1.84				1.92		1.99	2.06	2.17		
EP933	EPDBE-2004-2-ATH	0.4	0.3	2	0.37	0.37	50	4	2	2.36	2.46	2.54	2.62	2.75	
EP934	EPDBE-2004-2.5-ATH			2.5						2.89	3	3.09	3.18	3.34	
EP935	EPDBE-2004-3-ATH			3						3.41	3.53	3.63	3.73	4.01	
EP936	EPDBE-2004-3.5-ATH			3.5						3.93	4.06	4.18	4.27	4.67	
EP937	EPDBE-2004-4-ATH			4						4.45	4.59	4.71	4.83	5.33	
EP938	EPDBE-2004-4.5-ATH			4.5						4.97	5.12	5.25	5.43	6	
EP939	EPDBE-2005-1-ATH	0.5	0.35	1	0.47	0.47				1.31	1.37	1.42	1.47	1.57	
EP940	EPDBE-2005-1.5-ATH			1.5						1.83	1.91	1.98	2.05	2.17	
EP941	EPDBE-2005-2-ATH			2						2.36	2.45	2.54	2.61	2.75	
EP942	EPDBE-2005-2.5-ATH			2.5						2.88	2.99	3.09	3.17	3.33	
EP943	EPDBE-2005-3-ATH			3						3.41	3.53	3.63	3.72	3.99	
EP944	EPDBE-2005-4-ATH			4						4.45	4.59	4.71	4.82	5.32	
EP945	EPDBE-2005-5-ATH			5						5.48	5.65	5.78	6.01	6.65	
EP946	EPDBE-2005-5.5-ATH			5.5						6	6.17	6.31	6.61	7.31	
EP947	EPDBE-2005-6-ATH	6	6.52	6.7	6.88	7.21	7.97								
EP948	EPDBE-2005-8-ATH	0.6	0.4	8	0.57	0.57			4	8.58	8.79	9.16	9.6	10.63	
EP949	EPDBE-2006-1-ATH			1						1.44	1.54	1.63	1.71	1.88	
EP950	EPDBE-2006-2-ATH			2						2.52	2.66	2.79	2.91	3.13	
EP951	EPDBE-2006-2.5-ATH			2.5						3.05	3.22	3.36	3.49	3.73	
EP952	EPDBE-2006-3-ATH			3						3.58	3.77	3.93	4.07	4.32	
EP953	EPDBE-2006-3.5-ATH			3.5						4.12	4.32	4.49	4.64	4.91	

Ultra Micro Grain Solid Carbide End Mill

EPDBE-ATH | Epoch Deep Ball Evolution ATH

ID Code	Item Code	Z	Size							Actual Effective Length in Incline angles										
			ØD	In	l	Ødn	L	Ød	Neck R	0.5°	1°	1.5°	2°	3°						
EP954	EPDBE-2006-4-ATH	2	0.6	4	0.4	0.57	50	4	4	4.64	4.86	5.04	5.2	5.48						
EP955	EPDBE-2006-4.5-ATH			4.5						5.17	5.4	5.59	5.76	6.06						
EP956	EPDBE-2006-5-ATH			5						5.7	5.94	6.14	6.32	6.63						
EP957	EPDBE-2006-5.5-ATH			5.5						6.22	6.48	6.69	6.87	7.29						
EP958	EPDBE-2006-6-ATH			6						6.75	7.02	7.23	7.42	7.96						
EP959	EPDBE-2006-7-ATH			7						7.79	8.08	8.32	8.52	9.28						
EP960	EPDBE-2006-8-ATH			8						8.84	9.15	9.4	9.61	10.61						
EP961	EPDBE-2006-9-ATH			9						9.88	10.21	10.47	10.79	11.94						
EP962	EPDBE-2006-10-ATH			10						10.92	11.26	11.54	11.99	13.27						
EP963	EPDBE-2006-12-ATH			12						12.99	13.37	13.72	14.38	15.92						
EP964	EPDBE-2007-2-ATH			0.7						2	0.45	0.67	50	4	4	2.52	2.66	2.79	2.9	3.12
EP965	EPDBE-2007-4-ATH									4						4.64	4.86	5.04	5.2	5.48
EP966	EPDBE-2007-6-ATH		6		6.74	7.01	7.23	7.42	7.94											
EP967	EPDBE-2007-8-ATH		8		8.83	9.14	9.39	9.61	10.6											
EP968	EPDBE-2008-2-ATH		0.8	2	0.5	0.77	50	4	4	2.51	2.65	2.78	2.89	3.11						
EP969	EPDBE-2008-4-ATH			4						4.64	4.85	5.03	5.19	5.47						
EP970	EPDBE-2008-5-ATH			5						5.69	5.93	6.13	6.31	6.61						
EP971	EPDBE-2008-6-ATH			6						6.74	7.01	7.23	7.41	7.92						
EP972	EPDBE-2008-8-ATH			8						8.83	9.14	9.39	9.6	10.58						
EP973	EPDBE-2008-10-ATH			10						10.91	11.26	11.53	11.97	13.23						
EP974	EPDBE-2009-2-ATH			2						2.51	2.65	2.77	2.89	3.1						
EP975	EPDBE-2009-4-ATH			4						4.64	4.85	5.03	5.18	5.46						
EP976	EPDBE-2009-6-ATH		6	6.74	7	7.22	7.41	7.91												
EP977	EPDBE-2009-8-ATH		8	8.83	9.14	9.38	9.6	10.56												
EP978	EPDBE-2010-2-ATH		1	2	0.8	0.96	50	4	4	2.54	2.67	2.79	2.9	3.11						
EP979	EPDBE-2010-3-ATH			3						3.61	3.78	3.93	4.06	4.3						
EP980	EPDBE-2010-4-ATH			4						4.66	4.87	5.04	5.2	5.47						
EP981	EPDBE-2010-5-ATH			5						5.72	5.95	6.14	6.31	6.61						
EP982	EPDBE-2010-6-ATH			6						6.76	7.02	7.23	7.42	7.92						
EP983	EPDBE-2010-7-ATH			7						7.81	8.09	8.32	8.52	9.25						
EP984	EPDBE-2010-8-ATH			8						8.85	9.15	9.4	9.61	10.58						
EP985	EPDBE-2010-9-ATH			9						9.89	10.21	10.47	10.78	11.91						
EP986	EPDBE-2010-10-ATH			10						10.93	11.27	11.54	11.98	13.23						
EP987	EPDBE-2010-12-ATH			12						13	13.37	13.72	14.37	15.89						
EP988	EPDBE-2010-13-ATH		13	14.04	14.42	14.86	15.57	17.21												
EP989	EPDBE-2010-14-ATH		14	15.07	15.47	16	16.76	18.54												
EP990	EPDBE-2010-16-ATH		16	17.13	17.56	18.28	19.16	21.2												
EP991	EPDBE-2010-18-ATH		18	19.19	19.66	20.56	21.55	23.85												
EP992	EPDBE-2010-20-ATH		20	21.25	21.84	22.84	23.94	26.51												
EP993	EPDBE-2011-2-ATH		1.1	2	1	1.05	50	4	4	2.58	2.7	2.81	2.92	3.12						
EP994	EPDBE-2011-4-ATH			4						4.69	4.89	5.06	5.21	5.48						
EP995	EPDBE-2011-6-ATH			6						6.79	7.04	7.25	7.43	7.94						
EP996	EPDBE-2011-8-ATH			8						8.87	9.17	9.41	9.61	10.59						
EP997	EPDBE-2011-10-ATH		10	10.95	11.28	11.55	12	13.25												
EP998	EPDBE-2012-4-ATH		1.2	4	1.1	1.15	50	4	4	4.69	4.88	5.05	5.2	5.47						
EP999	EPDBE-2012-8-ATH			8						8.87	9.16	9.4	9.61	10.58						
EP1000	EPDBE-2012-10-ATH			10						10.95	11.28	11.54	11.99	13.23						
EP1001	EPDBE-2012-12-ATH			12						13.02	13.38	13.73	14.38	15.89						
EP1002	EPDBE-2014-8-ATH			8						8.89	9.18	9.41	9.61	10.58						
EP1003	EPDBE-2014-12-ATH			12						13.04	13.39	13.74	14.39	15.89						
EP1004	EPDBE-2014-16-ATH			16						17.16	17.57	18.31	19.17	21.2						
EP1005	EPDBE-2015-4-ATH			1.5						4	1.35	1.44	50	4	4	4.71	4.89	5.06	5.2	5.46
EP1006	EPDBE-2015-6-ATH		6		6.81	7.04	7.25	7.42	7.91											
EP1007	EPDBE-2015-8-ATH		8		8.89	9.17	9.41	9.61	10.56											
EP1008	EPDBE-2015-10-ATH		10		10.96	11.29	11.55	11.98	13.22											
EP1009	EPDBE-2015-12-ATH		12		13.03	13.39	13.74	14.38	15.87											
EP1010	EPDBE-2015-14-ATH		14		15.1	15.48	16.02	16.77	18.52											
EP1011	EPDBE-2015-16-ATH		16		17.16	17.57	18.3	19.16	21.18											
EP1012	EPDBE-2015-18-ATH		18		19.22	19.69	20.58	21.56	23.83											
EP1013	EPDBE-2015-20-ATH		20		21.27	21.87	22.86	23.95	x											
EP1014	EPDBE-2016-8-ATH		1.6		8	1.4	1.54	50	4	4						8.89	9.17	9.4	9.6	10.55
EP1015	EPDBE-2016-12-ATH			12	13.03						13.39	13.73	14.37	15.85						
EP1016	EPDBE-2016-16-ATH			16	17.16						17.57	18.29	19.15	21.16						
EP1017	EPDBE-2016-20-ATH			20	21.27						21.87	22.86	23.94	x						

Ø1.8-Ø6

Ultra Micro Grain Solid Carbide End Mill

EPDBE-ATH | Epoch Deep Ball Evolution ATH

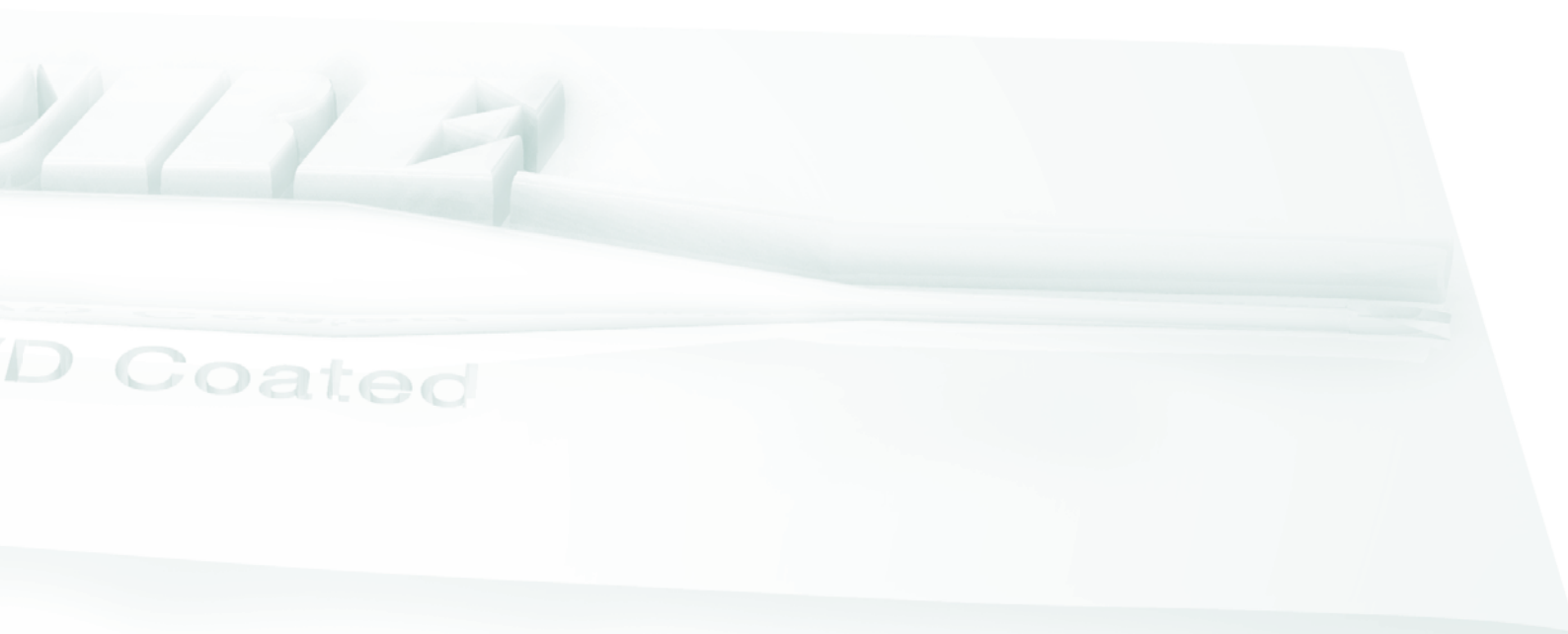
ID Code	Item Code	Size								Actual Effective Length in Incline angles						
		Z	ØD	In	l	Ødn	L	Ød	Neck R	0.5°	1°	1.5°	2°	3°		
EP1018	EPDBE-2018-8-ATH	2	1.8	8	1.6	1.73	50	4		8.91	9.18	9.41	9.61	10.54		
EP1019	EPDBE-2018-12-ATH			12			55			13.05	13.4	13.74	14.38	15.85		
EP1020	EPDBE-2018-16-ATH			16			60			17.17	17.58	18.31	19.16	21.16		
EP1021	EPDBE-2018-20-ATH			20			21.28			21.88	22.87	23.95	x			
EP1022	EPDBE-2020-3-ATH		3	2	1.7	1.92	50			4		3.71	3.84	3.96	4.07	4.29
EP1023	EPDBE-2020-4-ATH		4									4.75	4.92	5.07	5.21	5.45
EP1024	EPDBE-2020-6-ATH		6									6.84	7.07	7.26	7.43	7.89
EP1025	EPDBE-2020-8-ATH		8									8.92	9.19	9.42	9.61	10.54
EP1026	EPDBE-2020-10-ATH		10									11	11.3	11.56	11.99	13.2
EP1027	EPDBE-2020-12-ATH		12									13.06	13.41	13.76	14.39	15.85
EP1028	EPDBE-2020-13-ATH	13	14.1					14.45	14.9			15.58	17.18			
EP1029	EPDBE-2020-14-ATH	14	15.13					15.5	16.04			16.78	18.51			
EP1030	EPDBE-2020-16-ATH	16	17.19					17.59	18.32			19.17	x			
EP1031	EPDBE-2020-18-ATH	18	19.24					19.72	20.6			21.57	x			
EP1032	EPDBE-2020-20-ATH	20	21.3	21.9	22.88	23.96	x									
EP1033	EPDBE-2020-22-ATH	22	23.35	24.08	25.16	26.35	x									
EP1034	EPDBE-2020-25-ATH	25	26.42	27.35	28.58	x	x									
EP1035	EPDBE-2020-30-ATH	30	31.53	32.8	34.29	x	x									
EP1036	EPDBE-2020-35-ATH	35	36.65	38.24	x	x	x									
EP1037	EPDBE-2020-40-ATH	40	41.86	43.69	x	x	x									
EP1038	EPDBE-2025-6-ATH	6	2.5	2	2.4	50	4		6.88	7.09	7.27	7.43	7.87			
EP1039	EPDBE-2025-10-ATH	10				11.03			11.32	11.56	12	13.18				
EP1040	EPDBE-2025-15-ATH	15				16.18			16.56	17.2	17.98	x				
EP1041	EPDBE-2025-20-ATH	20				21.32			21.93	22.9	x	x				
EP1042	EPDBE-2025-25-ATH	25				26.44			27.38	28.6	x	x				
EP1043	EPDBE-2025-30-ATH	30				31.55			32.82	x	x	x				
EP1044	EPDBE-2030-8-ATH	8	3	2.5	2.88	55	6		8.99	9.23	9.44	9.62	10.51			
EP1045	EPDBE-2030-10-ATH	10				11.06			11.34	11.57	12.01	13.16				
EP1046	EPDBE-2030-13-ATH	13				14.15			14.48	14.94	15.6	17.15				
EP1047	EPDBE-2030-16-ATH	16				17.24			17.61	18.36	19.19	21.13				
EP1048	EPDBE-2030-20-ATH	20				21.34			21.96	22.92	23.97	26.44				
EP1049	EPDBE-2030-25-ATH	25				26.46			27.41	28.62	29.96	x				
EP1050	EPDBE-2030-30-ATH	30				31.57			32.85	34.32	35.94	x				
EP1051	EPDBE-2030-35-ATH	35				36.72			38.3	40.03	41.92	x				
EP1052	EPDBE-2035-15-ATH	15				16.25			16.6	17.26	18.03	19.81				
EP1053	EPDBE-2035-25-ATH	25				26.49			27.46	28.67	29.99	x				
EP1054	EPDBE-2035-35-ATH	35	36.79	38.36	40.07	x	x									
EP1055	EPDBE-2035-45-ATH	45	47.22	49.25	x	x	x									
EP1056	EPDBE-2040-10-ATH	10	4	3	3.85	55	6		11.1	11.36	11.58	12	13.1			
EP1057	EPDBE-2040-13-ATH	13				14.19			14.5	14.95	15.59	17.08				
EP1058	EPDBE-2040-16-ATH	16				17.27			17.63	18.37	19.18	x				
EP1059	EPDBE-2040-20-ATH	20				21.37			21.99	22.93	23.96	x				
EP1060	EPDBE-2040-25-ATH	25				26.49			27.44	28.63	29.95	x				
EP1061	EPDBE-2040-30-ATH	30				31.59			32.89	34.34	x	x				
EP1062	EPDBE-2040-35-ATH	35				36.78			38.33	40.04	x	x				
EP1063	EPDBE-2040-40-ATH	40				41.99			43.78	x	x	x				
EP1064	EPDBE-2040-45-ATH	45				47.2			49.23	x	x	x				
EP1065	EPDBE-2040-50-ATH	50				52.42			54.68	x	x	x				
EP1066	EPDBE-2050-20-ATH	20	21.36	21.95	x	x	x									
EP1067	EPDBE-2050-25-ATH	25	26.48	27.39	x	x	x									
EP1068	EPDBE-2050-30-ATH	30	31.58	x	x	x	x									
EP1069	EPDBE-2050-40-ATH	40	41.97	x	x	x	x									
EP1070	EPDBE-2060-12-ATH	12	6	6	5.85	60			x	x	x	x	x			
EP1071	EPDBE-2060-20-ATH	20				x			x	x	x	x				
EP1072	EPDBE-2060-30-ATH	30				x			x	x	x	x				
EP1073	EPDBE-2060-50-ATH	50				x			x	x	x	x				



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