

TyCarb[®] focus

01.16

TyCarb High Feed Milling Program

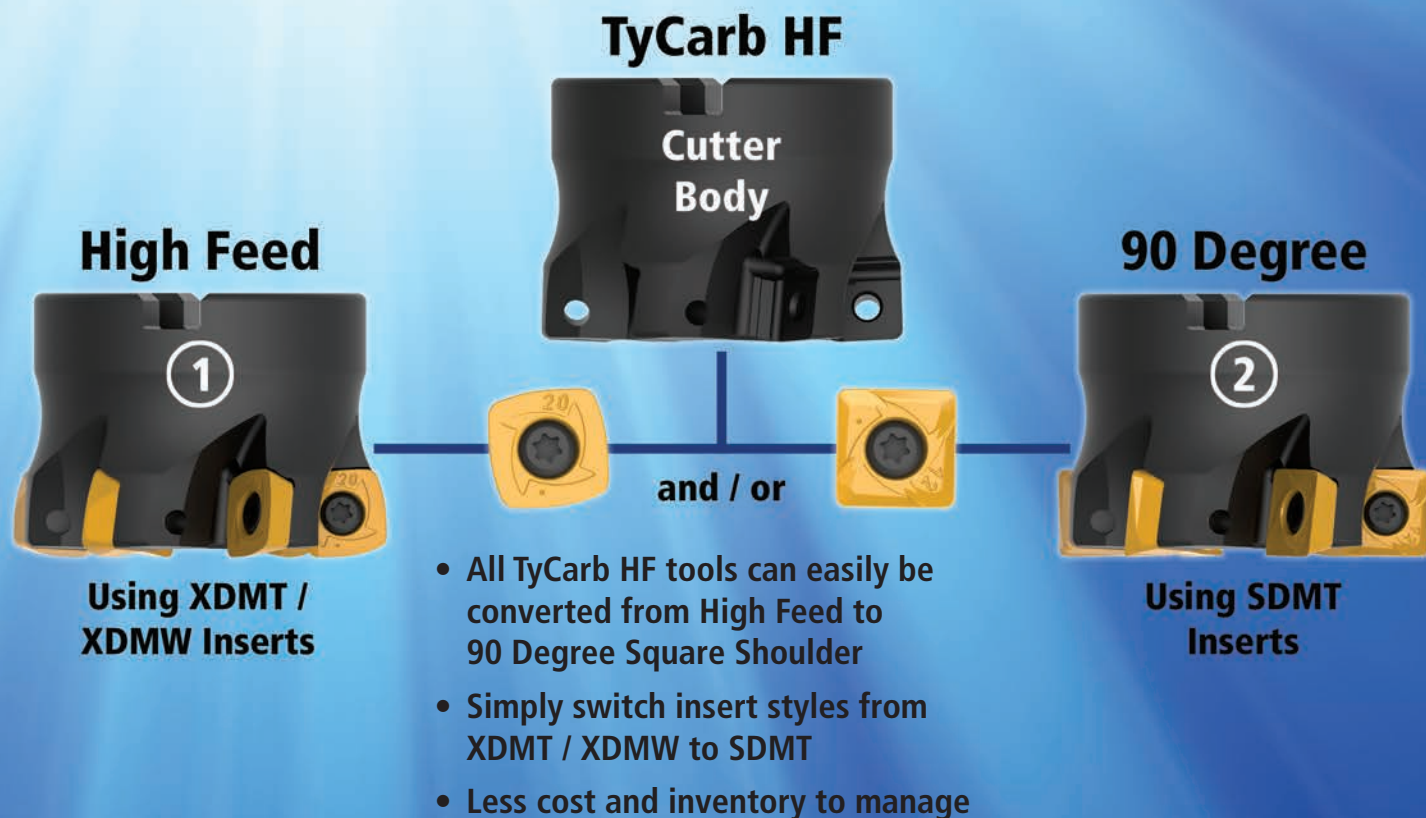
A Comprehensive offering of Tooling Designed for High Feed Machining

- Exceptional Material Removal
- Two Indexable Insert Sizes
 - Cost Effective 4 Corner Design
- Two Milling Cutters in One Cutter Body Design
 - High Feed or and / or 90 Degree Square Shoulder
- Solid Carbide End Mill Versions

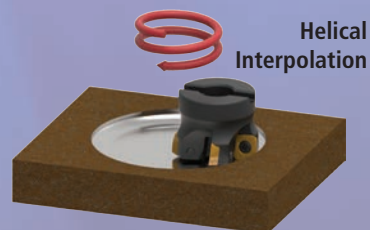
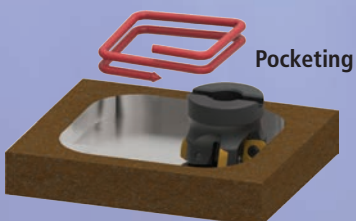
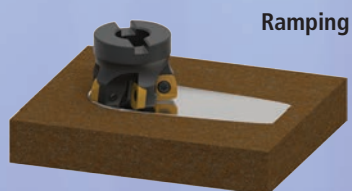
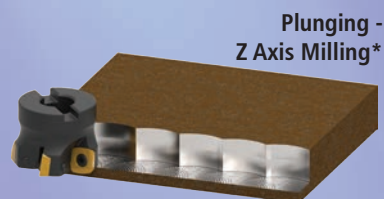
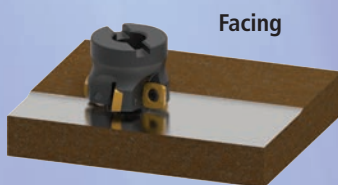
**New TyCarb
Milling Program**



Two Unique Tools Engineered into One Cutter Body Design:



Applications

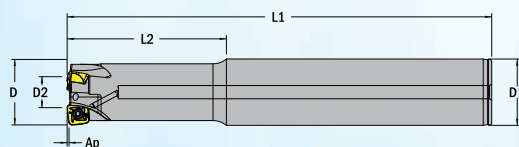


*High Feed Only

High Feed End Mills

HF10 End Mills

End Mills with Weldon Shanks and
Extended Length End Mills with Cylindrical Shanks

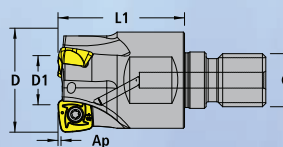


Designation	D	D1	D2	L1	L2	Ap	Flutes
INSERTS: High Feed XDMT-100415 / XDMW-100415 • Square Shoulder SDMT-100408							
HF10EM-1000-5.00H2	1.000	1.000	.375	5.00	2.72	.04	2
HF10EM-1000-5.00H3				5.00			3
HF10CY-1000-8.00H2*				8.00	3.00		2
HF10CY-1000-10.00H2*				10.00			2
HF10EM-1250-6.00J3	1.250	1.250	.620	6.00	3.72	.04	3
HF10CY-1250-8.00J3*				8.00	3.00		3
HF10CY-1250-10.00J3*				10.00			3
HF10EM-1500-6.00J3	1.500	1.250	.866	6.00	-	.04	3
HF10CY-1500-8.00J3*				8.00	-		3
Insert Screw: TX9P-3007 • Flag Wrench: W-37048 • Screw Driver: W-36229							

*End Mills with Cylindrical Shanks



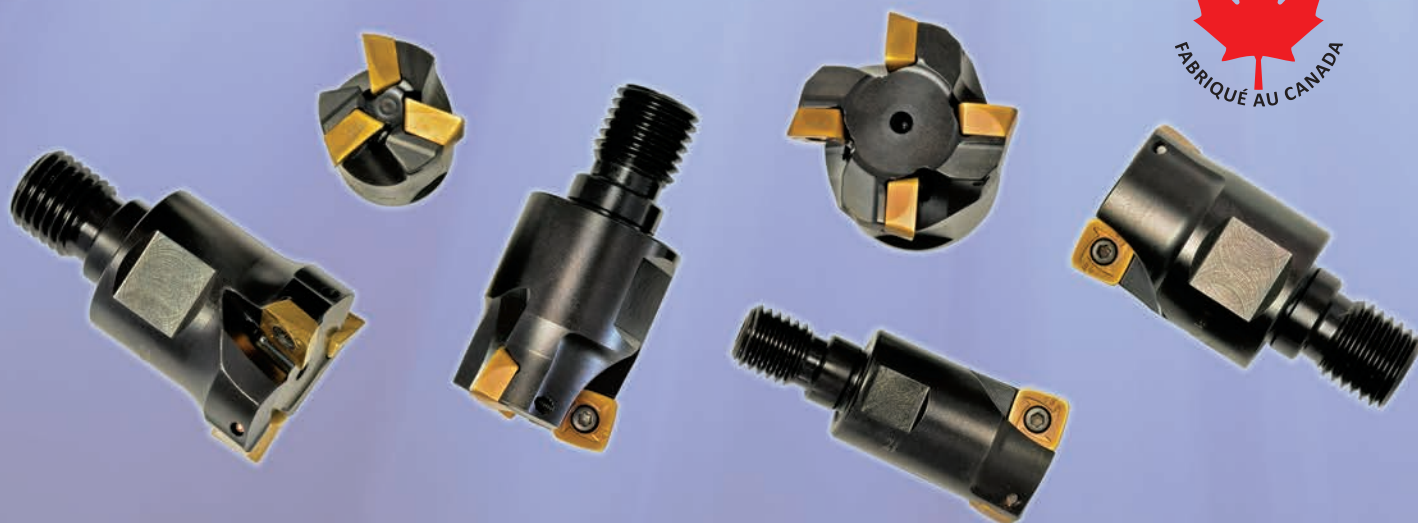
**Custom Sizes and Lengths
Available On Request**



HF10 Thread-On End Mills

Thread-On End Mills with Through Coolant

Designation	D	D1	L1	G	Ap	Flutes
INSERTS: High Feed XDMT-100415 / XDMW-100415 • Square Shoulder SDMT-100408						
HF10TS-1000-M12-2	1.000	.375	1.50	M12	.04	2
HF10TS-1000-M12-3						3
HF10TS-1250-M16-2	1.250	.620	1.50	M16	.04	2
HF10TS-1250-M16-3						3
HF10TS-1500-M16-3	1.500	.866	1.50	M16	.04	3
HF10TS-1500-M16-4						4
Insert Screw: TX9P-3007 • Flag Wrench: W-37048 • Screw Driver: W-36229						



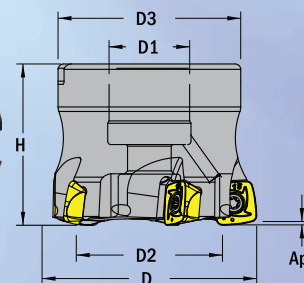
High Feed Face Mills

TVcarb**focus**

HF10 Face Mills

Face Mill Design with Through Coolant

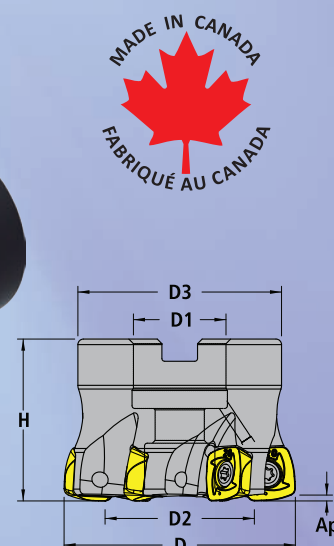
Designation	D	D1	D2	D3	H	Ap	Flutes
INSERTS: High Feed XDMT-100415 / XDMW-100415 • Square Shoulder SDMT-100408							
HF10SM-2000-1.50F5	2.000	.750	1.365	1.70	1.50	.04	5
HF10SM-2000-1.50F7							7
Insert Screw: TX9P-3007 • Flag Wrench: W-36548 • Screw Driver: W-36229							



HF14 Face Mills

Face Mill Design with Through Coolant

Designation	D	D1	D2	D3	H	Ap	Flutes
INSERTS: High Feed XDMT-140520 / XDMW-140520 • Square Shoulder SDMT-140512							
HF14SM-2000-1.50F4	2.000	.750	1.122	1.70	1.50	.08	4
HF14SM-2000-1.50F5							5
HF14SM-2500-1.75H6	2.500	1.000	1.619	2.20	1.75	.08	6
HF14SM-3000-2.00H5	3.000	1.000	2.118	2.75	2.00	.08	5
HF14SM-3000-2.00J5		1.250					5
HF14SM-3000-2.00H7		1.000					7
HF14SM-3000-2.00J7		1.250					7
HF14SM-4000-2.00J8	4.000	1.250	3.116	2.75	2.00	.08	8
HF14SM-4000-2.00L8		1.500		3.80			8
HF14SM-6000-2.00L10	6.000	1.500	5.116	3.80	2.00	.08	10
HF14SM-8000-2.50T12	8.000	2.500	7.114	5.50			12
Insert Screw: TX20-1250 • Flag Wrench: W-36535 • Screw Driver: W-45531							



**Custom Sizes and Heights
Available On Request**



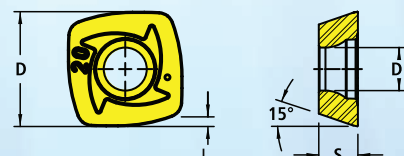
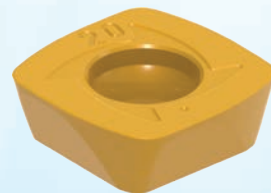
High Feed Indexable Inserts

TyCarbfocus

High Feed XDMT / XDMW Inserts

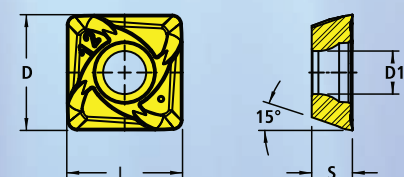
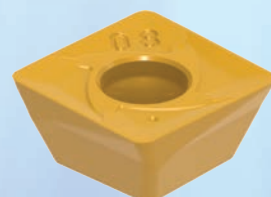
Designation	D	S	D1	L	Rt	NP20MC	NP25MP	NP30MC	NP35MP	NM40MP	NK15MC	NK20MP
XDMT-100415ER-MH	.402	.187	.138	.040	.089					●		
XDMT-100415SR-PH						●	●					
XDMW-100415SR-KH											●	●
XDMW-100415SR-PH								●	●			
XDMT-140520ER-MH	.579	.197	.217	.080	.136					●		
XDMT-140520SR-PH						●	●					
XDMW-140520SR-KH											●	●
XDMW-140520SR-PH								●	●			

Rt= Theoretical Radius for Programming



Square Shoulder SDMT Inserts

Designation	D	S	D1	L	Rad	NP20MC	NP25MP	NP30MC	NP35MP	NM40MP	NK15MC	NK20MP
SDMT-100408ER-M	.409	.191	.138	.409	.031					●		
SDMT-100408SR-K												●
SDMT-100408SR-P									●			
SDMT-140512ER-M	.583	.205	.217	.583	.047					●		
SDMT-140512SR-K												●
SDMT-140512SR-P									●			



NP20MC (HC-P20) An alternative (harder) new generation CVD coated grade to NP25MP when higher abrasion resistance is required. Suitable for all steels at higher cutting speeds in stable conditions.

NP25MP (HC-P25/M25) A PVD multi-purpose grade suitable for all steels and stainless steel at high cutting speeds with or without coolant in stable conditions.

NP30MC (HC-P30) A universal grade with a tough carbide substrate and new generation CVD coating making an excellent choice for dry machining on a range of steels at moderate cutting speeds.

NP35MP (HC-P35/M35) A tough PVD coated grade for all steels and stainless steels. Most suitable for dry machining under difficult conditions at low to moderate cutting speeds.

NM40MP (HC-M40) An extremely tough carbide substrate with smooth PVD coating. Suitable for austenitic and duplex stainless steels, at low to moderate cutting speeds. Suitable for use with coolant.

NK15MC (HC-K15) A hard new generation CVD coated grade for dry machining in all cast irons including grey, nodular and compacted graphite cast iron.

NK20MP (HC-K20/P10) A tough carbide substrate with a thick PVD coating makes this grade most suitable for machining of cast materials, but also hardened steel up to 54 Rc.

XDMT Best suited in straight high feed facing applications

XDMW Best suited in pocketing applications



High Feed Technical Data

TyCarb High Feed DOC & Programming Info

Insert	Rt	Ap	X	b
XDM_-100415	0.089	0.04	0.024	0.316
XDM_-140520	0.136	0.08	0.037	0.428

Rt= Theoretical Radius for Programming

X= Material Uncut

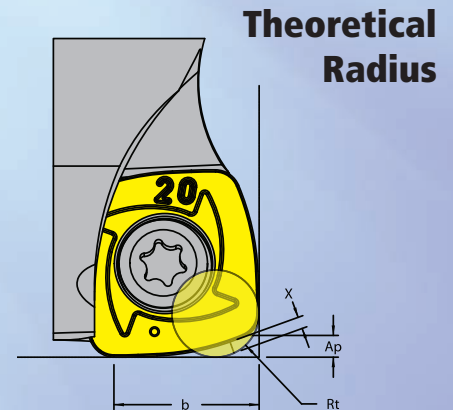
Programming

Theoretical Radius

- CAD / CAM systems will require a defined radius dimension in order to program for cavity machining. The "Rt" noted in the table above is defined as the Theoretical Radius to be used for programming of each XDMT/XDMW insert size.

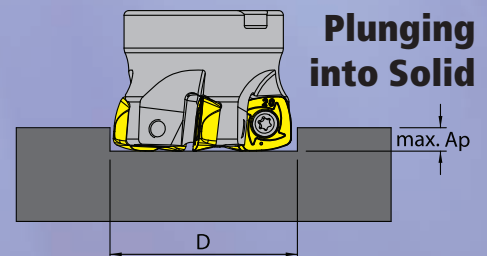
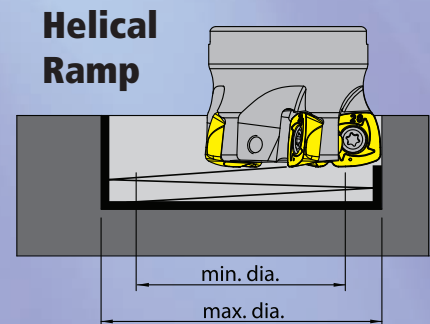
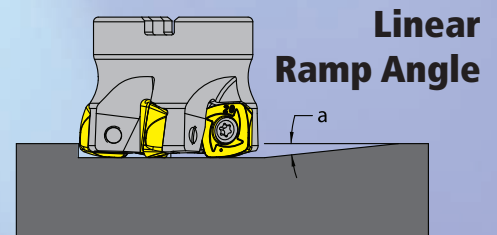
Overcutting and Material left Uncut

- When programming for high feed inserts with a Theoretical Radius, overcutting is a normal occurrence. The "X" value as detailed in the table indicates the value of material that will remain uncut.



TyCarb High Feed Ramp Angles & Interpolation Info

Insert	Dia.	Linear Ramp Angle 'a'	Helical Ramp		Z Axis Milling
			Min Dia	Max Dia	Step Over
XDMT-100415 XDMW-100415	1.00	4.5°	1.30	1.92	0.315
	1.25	3.0°	1.80	2.42	0.315
	1.50	2.3°	2.30	2.92	0.315
	2.00	1.7°	3.30	3.92	0.315
XDMT-140520 XDMW-140520	2.00	3.0°	3.10	3.92	0.413
	2.50	2.3°	4.10	4.92	0.413
	3.00	1.6°	5.10	5.92	0.413
	4.00	1.3°	7.10	7.92	0.413
	5.00	0.9°	9.10	9.92	0.413
	6.00	0.7°	11.10	11.92	0.413
	8.00	0.5°	15.10	15.92	0.413



Application Recommendations

Extended Length Tools

- When using TyCarb High Feed tools with extended lengths (such as HF10CY tools or HF10TS tools threaded onto long extensions), reduce the cutting conditions to 70% of recommended cutting data of standard length tools.

Machine Power and Work Piece Rigidity

- As machining conditions vary greatly based on machine power and workpiece stability, begin by using half of the recommended values in the Cutting Data tables and progressively increase values as the machine proves to operate within normal conditions.

Cutting Forces of High Feed vs Round Copy Mills

- TyCarb High Feed milling tools are designed to transfer the majority of the cutting forces axially to ensure the most stable cutting conditions. Typical milling with the use of round copy milling style cutters exert greater tangential forces, thereby increasing vibration and lowering productivity.

Air Blast

- Effective high feed machining will create large amounts of metal chips – use air blasts to prevent re-cutting of chips when pocketing or slotting.

Insert	Max Ap Plunging into Solid
XDM_-100415	0.030
XDM_-140520	0.035

Ty Carb focus

P

MK

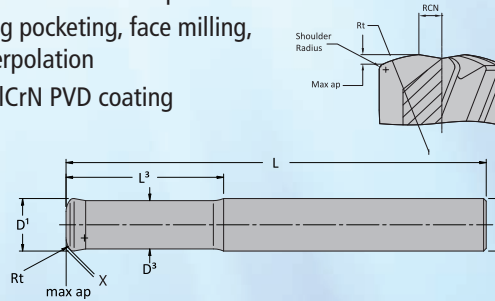
S

H

High Feed End Mill Program

TyCarb focus

- TyCarb High Feed end mills are designed for roughing to semi-finish applications
- Significantly reduces machining time in hardened materials
- TyCarb High Feed end mills are capable of feed rates up to 0.029 IPT
- Effective for Z axis machining including pocketing, face milling, helical ramping as well as circular interpolation
- Now available with next generation AlCrN PVD coating
- Excellent in long reach applications



High Feed End Mills

Designation	D1	D	Rt	X	Max ap	L	L ³	D ³	Flutes	TL30 Coated
HF4RC-DR0250-034	1/4	1/4	.034	.006	.013	2.50	.750	.210	4	●
HF4RC-DR0312-042	5/16	5/16	.042	.008	.017	3.00	1.00	.270	4	●
HF4RC-DR0375-051	3/8	3/8	.051	.010	.020	3.50	1.25	.340	4	●
HF4RC-DR0500-070	1/2	1/2	.070	.013	.028	4.00	1.50	.460	4	●
HF4RC-DR0625-085	5/8	5/8	.085	.016	.033	4.00	1.50	.590	4	●
HF5RC-DR0625-085	5/8	5/8	.085	.016	.033	4.00	1.50	.590	5	●
HF5RC-DR0750-100	3/4	3/4	.100	.019	.040	5.00	2.00	.710	5	●

Rt= Theoretical Radius for Programming

X= Material Uncut



Custom Sizes and Lengths
Available On Request

High Feed End Mills - Technical Programming Information

Cutter Dia. Inch	Max. ap	Rt	Shoulder	RCN	X	Circular Interpolation		Length of travel to max ap per deg.		
						Smallest	Largest	deg.	2 deg.	3 deg.
1/4	.013	.034	.020	.064	.006	.378	.500	.762	.381	.254
5/16	.017	.042	.024	.080	.008	.472	.625	.953	.476	.317
3/8	.020	.051	.030	.096	.010	.567	.750	1.143	.572	.381
1/2	.027	.070	.040	.126	.013	.752	1.000	1.525	.762	.508
5/8	.033	.085	.049	.160	.016	.945	1.250	1.906	.953	.635
3/4	.040	.100	.059	.192	.019	1.134	1.500	2.287	1.143	.762
All dimensions are shown in inch						Feed % Reduction:		100%	70%	50%

Recommended Cutting Parameters

Work Material	Axial DOC	Radial DOC	Speed		Recommended Feed (Inches Per Tooth)					
			Min.	Max.	1/4	5/16	3/8	1/2	5/8	3/4
Medium Carbon Steels ≤ 38 Rc 4140, 4340	0.05 x D	0.50 x D	500	650	.010 - .014	.012 - .016	.016 - .020	.020 - .025	.022 - .027	.024 - .029
Tool and Die Steels ≤ 38 Rc A2, D2, O1, S7, P20, H13	0.05 x D	0.50 x D	480	600	.010 - .014	.012 - .016	.016 - .020	.020 - .025	.022 - .027	.024 - .029
Tool Steels 39 Rc to 48 Rc	0.05 x D	0.50 x D	375	525	.006 - .010	.008 - .012	.012 - .014	.016 - .020	.017 - .022	.018 - .024
Easy to machine stainless steel 416, 410, PH Stainless	0.05 x D	0.50 x D	250	375	.006 - .010	.008 - .012	.012 - .014	.016 - .020	.017 - .022	.018 - .024
Hardened Tool Steels 48 - 53 Rc	0.05 x D	0.50 x D	350	500	.008 - .012	.010 - .014	.014 - .018	.018 - .022	.020 - .024	.020 - .027

TYSON TOOL®

TYSON TOOL COMPANY LIMITED
75 ORMONT DRIVE, TORONTO, ONTARIO, M9L-2S3
TEL: (416) 746-3688 ~ FAX: (416) 746-5415
INTERNET: www.tysontool.com ~ E-MAIL: sales@tysontool.com

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