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 and / or 90 Degree Square Shoulder

New TyCarb Milling Program

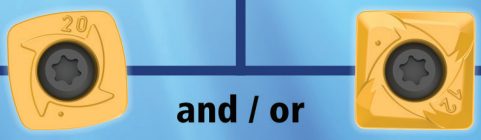
Two Unique Tools

Engineered into One Cutter Body Design:

TyCarb HF

High Feed

Using XDMT / XDMW Inserts

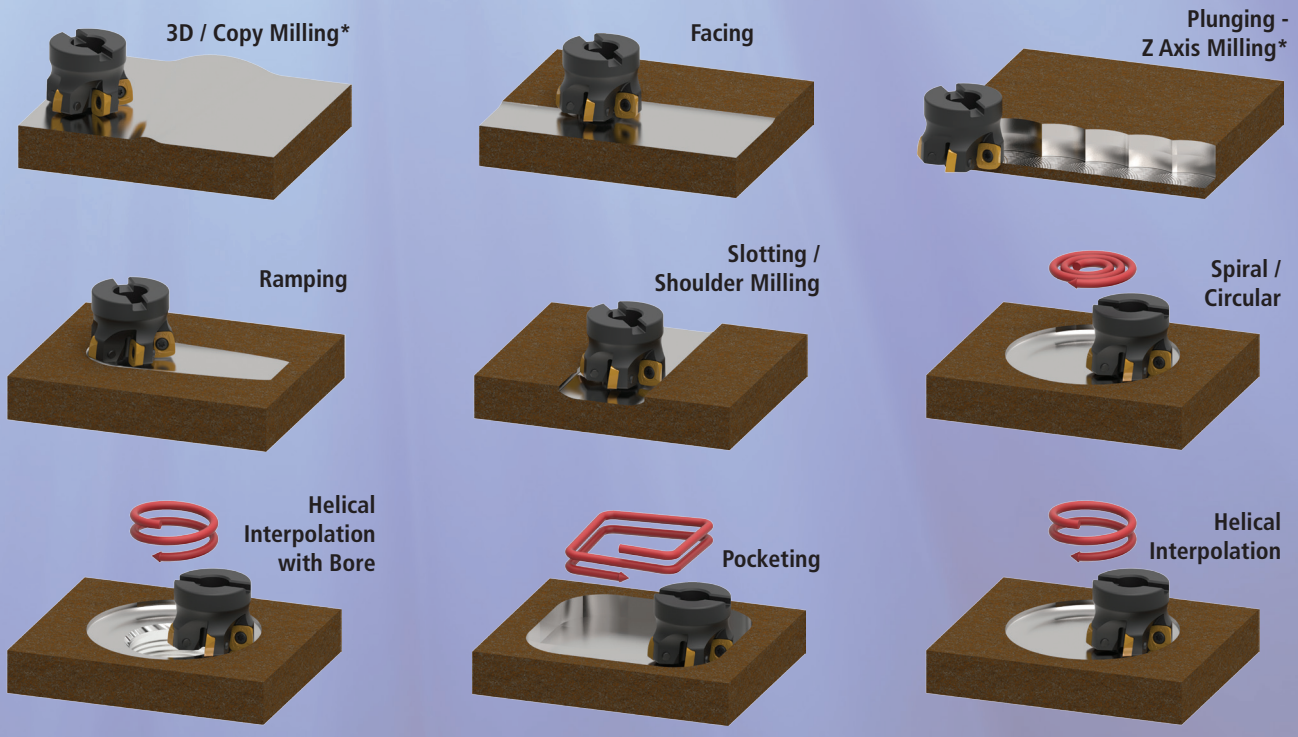


90 Degree

Using SDMT Inserts

- All TyCarb HF tools can easily be converted from High Feed to 90 Degree Square Shoulder
- Simply switch insert styles from XDMT / XDMW to SDMT
- Less cost and inventory to manage

Applications



*High Feed Only

High Feed End Mills

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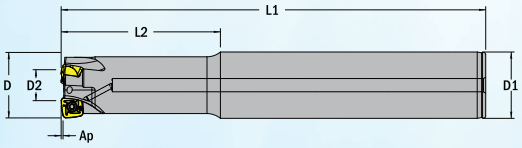
HF10 End Mills

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



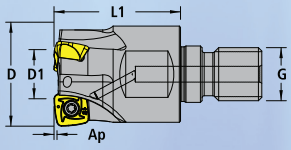
Designation	D	D1	D2	L1	L2	Ap	Flutes
INSERTS: High Feed XDMT-100415 / XDMW-100415 • Square Shoulder SDMT-100408							
HF10EM-1000-5.00H2	1.000	1.000	.375	5.00	2.72	.04	2
HF10EM-1000-5.00H3				5.00			3
HF10CY-1000-8.00H2*				8.00	3.00		2
HF10CY-1000-10.00H2*				10.00			2
HF10EM-1250-6.00J3	1.250	1.250	.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

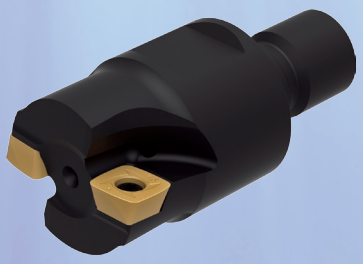
Custom Sizes and Lengths Available On Request

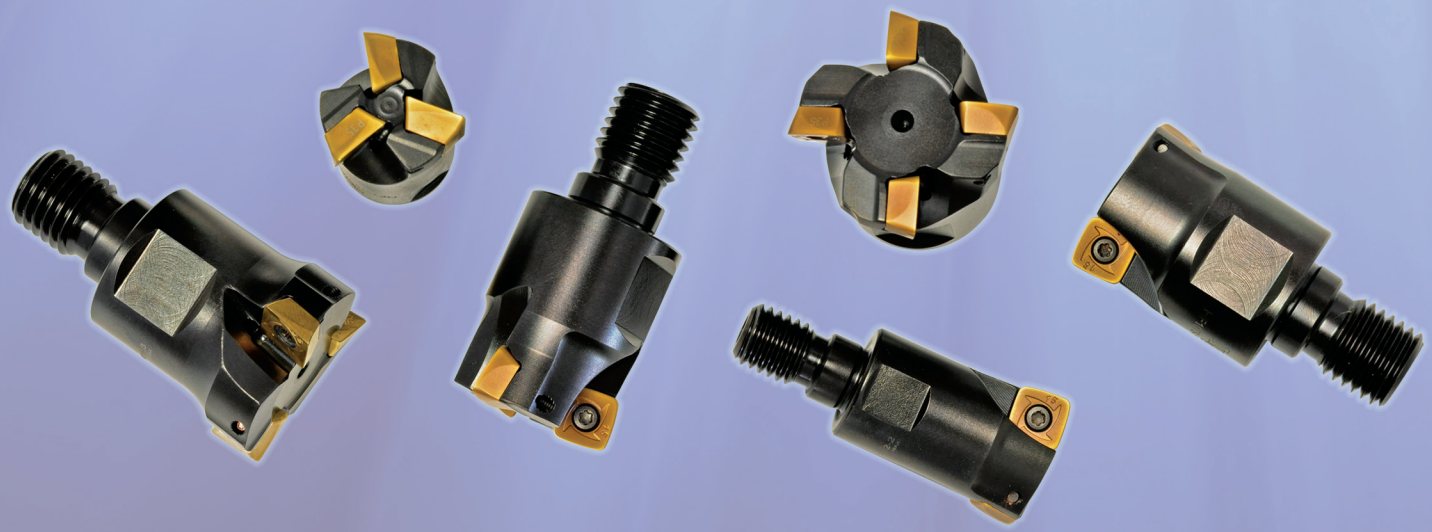
HF10 Thread-On End Mills

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

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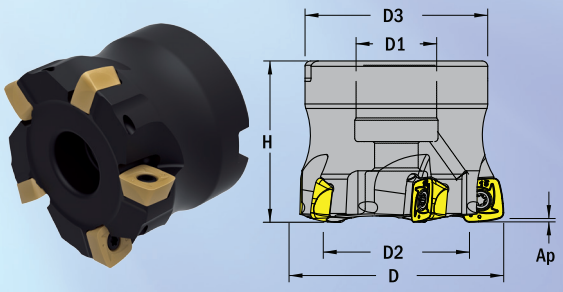
HF10 Face Mills

Face Mill Design with Through Coolant

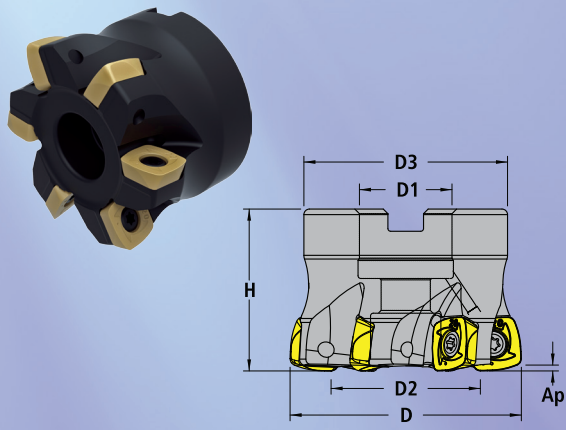
Designation	D	D1	D2	D3	H	Ap	Flutes
INSERTS: High Feed XDMT-100415 / XDMW-100415 • Square Shoulder SDMT-100408							
HF10SM-2000-1.50F5	2.000	.750	1.365	1.70	1.50	.04	5
HF10SM-2000-1.50F7							7
Insert Screw: TX9P-3007 • Flag Wrench: W-36548 • Screw Driver: W-36229							



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

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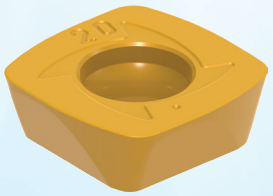
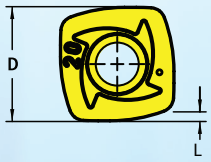
High Feed XDMT / XDMW Inserts

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								●	●			

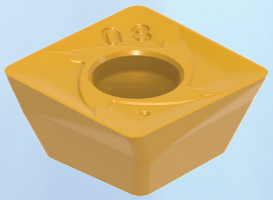
Rt= Theoretical Radius for Programming

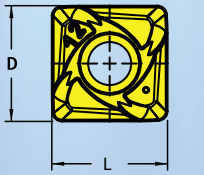




Square Shoulder SDMT Inserts

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

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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

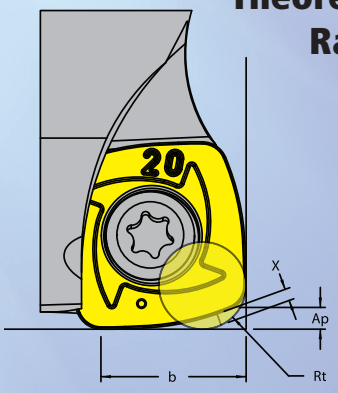
Programming

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.

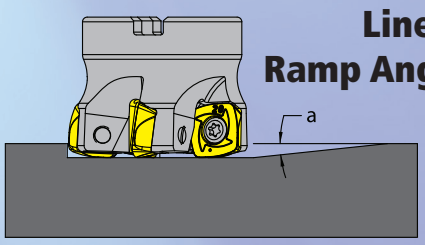
Overcutting and Material left Uncut

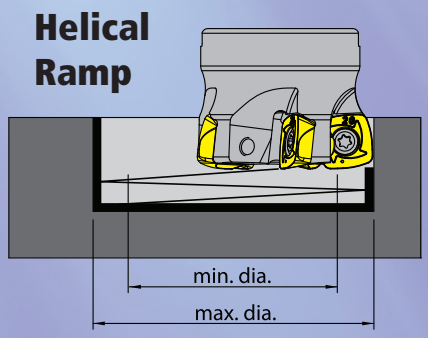
- When programming for high feed inserts with a Theoretical Radius, overcutting is a normal occurrence. The "X" value as detailed in the table indicates the value of material that will remain uncut.



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

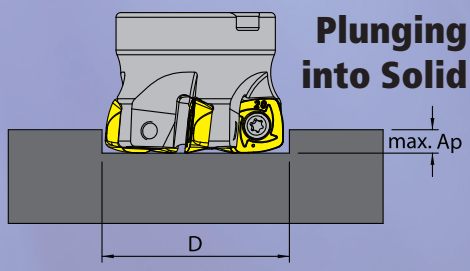
- As machining conditions vary greatly based on machine power and workpiece stability, begin by using half of the recommended values in the Cutting Data tables and progressively increase values as the machine proves to operate within normal conditions.

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

Cutting Data for HF10/HF14 Milling Cutters

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P

Cutting Data for HF10/HF14 High Feed Milling Cutter			HIGH PERFORMANCE COATED											
			NP20MC			NP25MP			NP30MC			NP35MP		
Carbide Insert	Max ap		feed per tooth *(inch)											
XDMT/XDMW 100415	0.040"	HFC	.028	.035	.063	.028	.035	.063	.028	.039	.063	.028	.039	.063
XDMT/XDMW 140520	0.080"		.028	.055	.087	.028	.055	.087	.028	.055	.098	.028	.055	.098
SDMT 100408	0.350"	90	.003	.006	.010	.003	.006	.010	.003	.006	.010	.003	.006	.010
SDMT 140512	0.472"		.004	.006	.011	.004	.006	.011	.004	.006	.011	.004	.006	.011
Work Material	Types		Vc SFM											
Steel, unalloyed, low carbon	A36, 1020, 1030, 1141		620	780	950	560	720	850	420	625	800	390	590	780
Steel, low to medium carbon	1045, 4140, 4340, 8620		525	650	750	475	590	710	500	590	710	475	580	690
Steel, alloyed and Tool Steels	H13, A2, D2, M2		475	590	710	425	525	625	425	500	620	400	490	590
Heat Treated Steels, Stainless Steels	410, 410S, 420		360	460	560									

M

Cutting Data for HF10/HF14 High Feed Milling Cutter			HIGH PERFORMANCE COATED									
			NP25MP			NP35MP			NM40MP			
Carbide Insert	Max ap		feed per tooth *(inch)									
XDMT/XDMW 100415	0.040"	HFC	.028	.035	.063	.028	.035	.063	.028	.035	.063	
XDMT/XDMW 140520	0.080"		.028	.055	.087	.028	.055	.087	.028	.055	.087	
SDMT 100408	0.350"	90	.003	.004	.006	.003	.004	.006	.003	.004	.006	
SDMT 140512	0.472"		.004	.007	.009	.004	.007	.009	.004	.007	.009	
Work Material	Types		Vc SFM									
Austenitic	303,304,316		295	425	490	260	360	460	325	425	525	
Heat treated Austenitic	17-4, 15-5		190	260	360				230	325	390	
Duplex	310mod,329								170	230	300	

K

Cutting Data for HF10/HF14 High Feed Milling Cutter			HIGH PERFORMANCE COATED									
			NK15MP			NK20MP			NP25MP			
Carbide Insert	Max ap		feed per tooth *(inch)									
XDMT/XDMW 100415	0.040"	HFC	.028	.039	.063	.028	.039	.063	.028	.039	.063	
XDMT/XDMW 140520	0.080"		.028	.055	.098	.028	.055	.098	.028	.055	.098	
SDMT 100408	0.350"	90	.003	.007	.012	.003	.007	.012	.003	.007	.012	
SDMT 140512	0.472"		.004	.010	.013	.004	.010	.013	.004	.010	.013	
Work Material	Hardness		Vc SFM									
Grey Cast Iron	Ferritic		600	800	1200	550	750	1050	460	720	980	
	Pearlitic		530	650	850	490	620	750	380	570	690	
Ductile Iron	Ferritic								360	475	590	
	Pearlitic								340	440	560	
Nodular Graphite Iron	Pearlitic		380	500	650	360	475	590	320	425	525	

S

Cutting Data for HF10/HF14 High Feed Milling Cutter			HIGH PERFORMANCE COATED									
			NM40MP									
Carbide Insert	Max ap		feed per tooth *(inch)									
XDMT/XDMW 100415	0.040"	HFC	.028	.035	.063							
XDMT/XDMW 140520	0.080"		.028	.055	.087							
SDMT 100408	0.350"	90	.003	.004	.006							
SDMT 140512	0.472"		.004	.007	.009							
Work Material	Types		Vc SFM									
Nickel/cobalt based Alloys	A-286, Inconel, Hasteloy, Waspaloy		90	160	230							
Titanium alloys	TiAL64v		90	160	260							

H

Cutting Data for HF10/HF14 High Feed Milling Cutter			HIGH PERFORMANCE COATED									
			NK20MP			NP20MC						
Carbide Insert	Max ap		feed per tooth *(inch)									
XDMT/XDMW 100415	0.040"	HFC	.014	.025	.040	.014	.020	.040				
XDMT/XDMW 140520	0.080"		.020	.040	.060	.020	.040	.060				
SDMT 100408	0.350"	90	.003	.005	.008	.003	.005	.008				
SDMT 140512	0.472"		.004	.006	.010	.004	.006	.010				
Work Material	Hardness		Vc SFM									
Hardened Steel	45-49 HRc		230	325	390	190	260	360				
	49-54 HRc		90	160	250							

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High Performance Milling Systems

TR360

TS90

HexMill 45

TCP90

LNMX

SNMX

Rani Tool Corp.

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