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Form No. 102981

Operating Instructions for:

110059	110064	500184
110060	110065	500185
110061	110066	500186
110062	110067	500187
110063	110068	500188

UNIFORCE® CLAMP

Max. Capacity: 5,000 PSI (For 110059, 110061, 110063, 110065, & 110067)
2,500 PSI (For 110060, 110062, 110064, 110066, & 110068)

U.S. Patent No. 6,019,357

SAFETY PRECAUTIONS

WARNING

To help prevent personal injury:

- **Do not exceed the rated capacity of the clamp.**
- **Clamping must take place within the specified stroke range to ensure that full force is applied to the workpiece.**
- **Spacer must be placed over the bolt between the steel wedge and the aluminum channel to prevent over-extension of the channel. Channel could break and be ejected if over-extension occurs. See Detail 1 on sheet 2 of 3 for proper installation of spacer.**
- **The centerline of the cylinder and clamp should always be centered between clamp contact surfaces to reduce side-loading. Excessive side-loading may cause damage to product, cap screw breakage and ejection of clamp parts.**
- **Screw must be secured in piston to prevent it from backing out during cycling.**
- **Some clamps are provided with spring pins to prevent the piston from turning during cycling and bolt adjustments. Spring pins will NOT take maximum torque of bolt.**

The buyer/installer/system designer utilizing Hytec Uniforce® clamps must be responsible for the safety of its users. They are only a component of a larger system that is purchased or designed by the buyer. The cylinders are rated at either 2,500 or 5,000 PSI maximum. Installation of these cylinders will require user supplied mounting cavities and oil supply passages which can safely withstand the highest hydraulic working pressure expected in the application. These cavities must be designed with an appropriated safety factor to resist the fatigue of repeated hydraulic pressurization and release. In addition, forces generated by the cylinder against the cavity must be considered.

These cylinders are designed to be used only in applications that "retain" the cylinder to prevent cylinder body movement and to stop the piston when fully retracted. Do not pressurize the installation cavity unless the cylinder body and piston rod are securely fastened and cannot be ejected from the application.

The Uniforce® clamp comes with a cap screw of specified length. This length will not be appropriate for all applications. When choosing a threaded fastener to connect the clamp to the cylinder, it is critical that it be capable of withstanding the load applied for the number of cycles expected in the life of the installation. Any side-loading of the fastener will increase its stress levels and must also be considered. Standard, commercially available fasteners may not be sufficient in high-cycle, high hydraulic pressure applications. Consult with a qualified design professional for assistance if required.

CONTINUED-

Note: Shaded areas reflect last revision(s) made to this form.

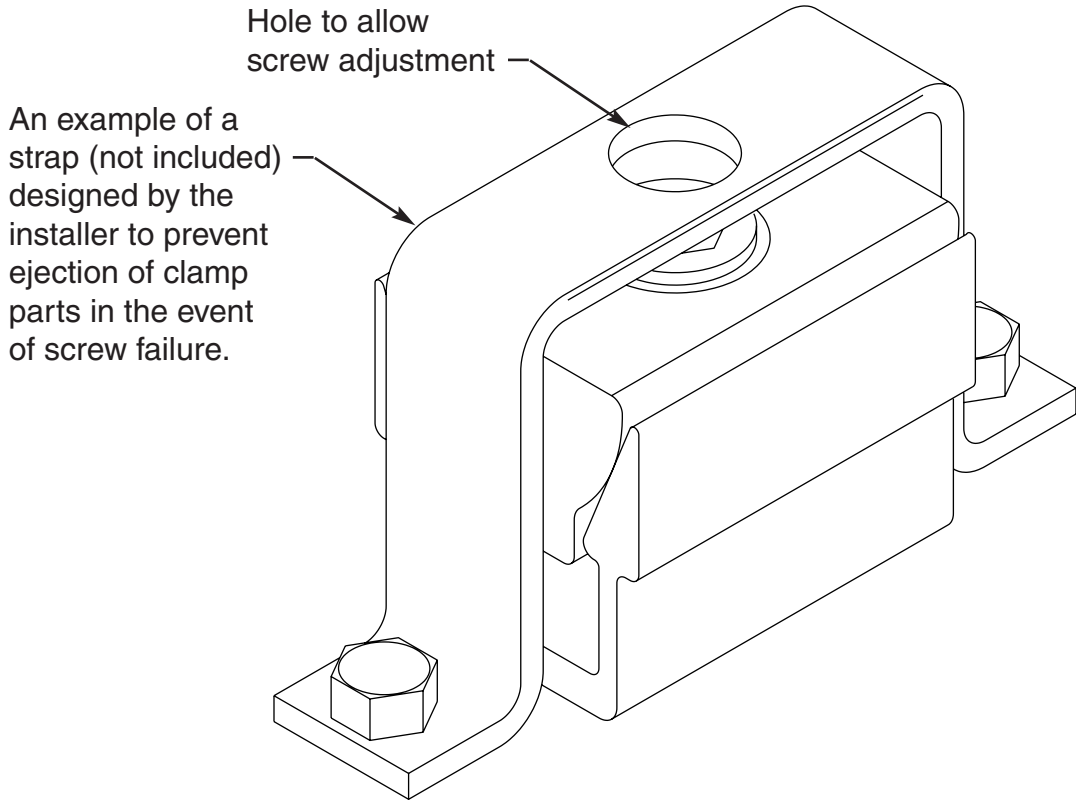
Litho in USA

SAFETY PRECAUTIONS (CONTINUED)

It is extremely important that the screw connecting the Uniforce® clamp always pulls straight. If the clamp contacts irregular sized workpieces, the cylinder will not be consistently centered between them. This will cause a bending moment in the cap screw when actuated and could lead to screw failure over time. When the Uniforce® clamp is used to contact a single workpiece, it is equally important that the clamp be centered between the workpiece and a solid stop. Variations in workpiece size in either application will cause bending in the screw and lead to premature failure.

⚠ WARNING

Because of variations in applications, Hytec has no way to estimate or control the bending stress in the fastener connecting the Uniforce® clamp to the hydraulic cylinder. This stress can lead to cap screw failure over time. It is strongly recommended that some means of capturing the screw and Uniforce® clamp to prevent it from being ejected from the fixture in the event of screw failure. A preventative maintenance program of periodic screw replacement is also recommended.



Only the system designer can know all application specific details affecting operator safety. Systems using these cylinders must be designed only by persons qualified to ensure safety.

INSTALLATION INSTRUCTIONS

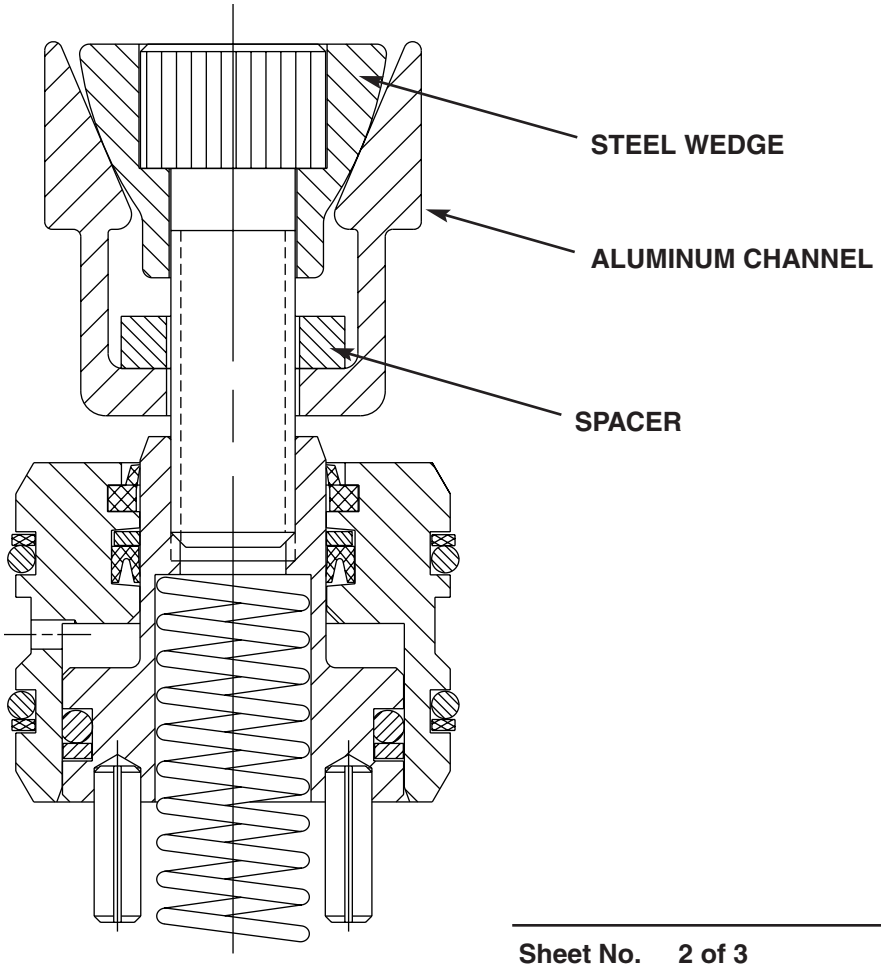
Note: In most cases, the cylinders are mounted deep within the fixture and are not directly exposed to the machining environment. However, the designer should take steps to prevent contaminant buildup around the piston.

For longest life of the cylinder and the fastener connecting the piston rod in your application, the cylinder must pull straight. Do not off-center load the cylinder by allowing the clamp to deflect radially. This is especially important when clamping a single workpiece and restraining the Uniforce® clamp with a solid stop. If the clamp is located against the stop while a gap exists between the clamp and the workpiece, the clamp will attempt to center itself and cause severe side-loading. To prevent side-loading, always center the Uniforce® clamp in the gap between two workpieces or the gap between one workpiece and the opposing solid stop.

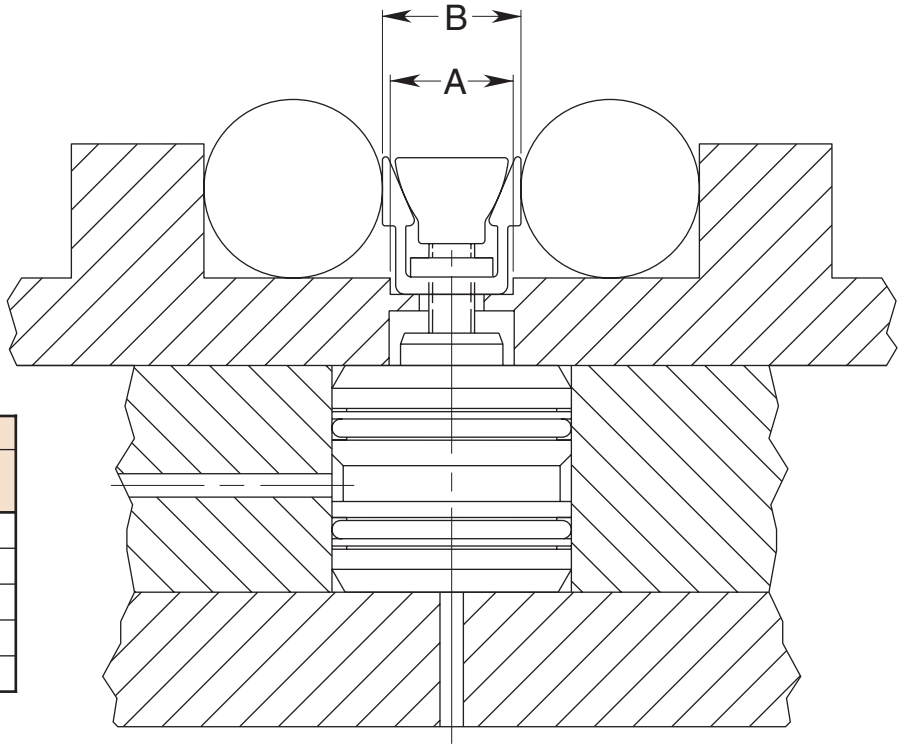
For longest seal life, the bore containing these cylinders must be smooth. We recommend a 65 micro-inch finish maximum. The specified chamfer and the intersecting oil passage must also be properly deburred and blended to prevent seal damage as the cylinder is inserted into the bore.

These installation instructions and the following illustrations describe the area where the intersecting oil passage hole(s) must be located. Any chamfering, deburring or blending of this hole must be within this range.

DETAIL 1 - ASSEMBLY OF UNIFORCE CLAMP



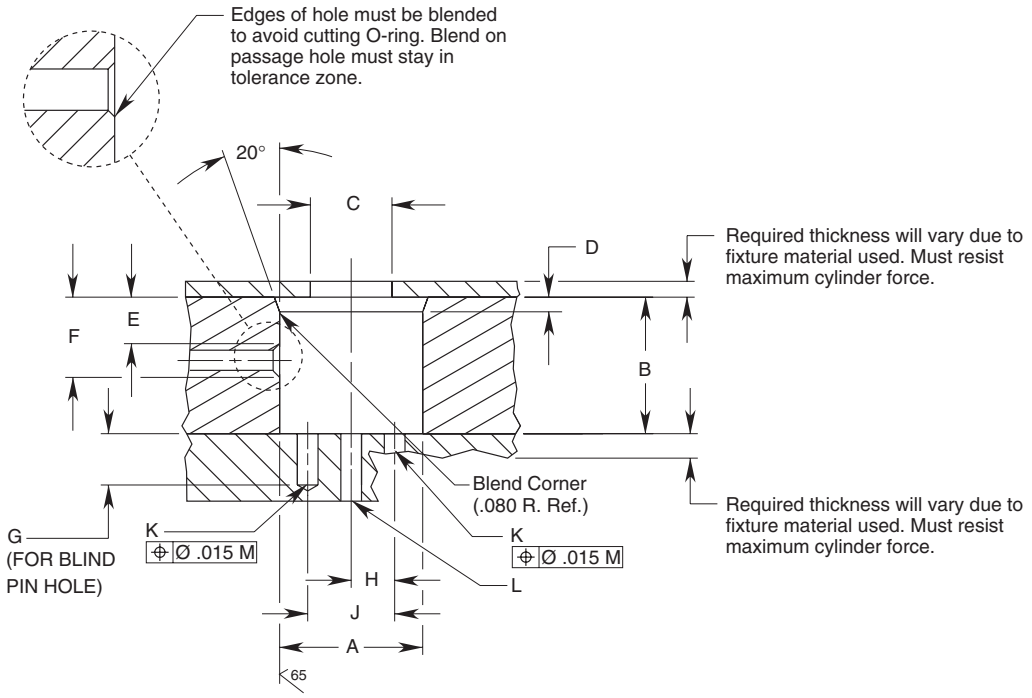
TYPICAL APPLICATION OF UNIFORCE CLAMP/PULL CYLINDER



Cat. No.	Dimensions (In Inches)	
	A Groove Width	B Workpiece Spacing
500184	.440	.500
500185	.665	.750
500186	.850	1.000
500187	1.245	1.500
500188	1.655	2.000

- **Groove “A” in fixture is recommended to maintain desired clamp orientation.**
- **Distance “B” is required spacing between workpieces for Uniforce® clamp clearance. The centerline for the cylinder and clamp should always be centered between clamp contact surfaces to reduce side-loading. Excessive side-loading may cause damage to product.**

CAVITY DIMENSIONS



Cat. No.	Cavity Dimensions (In Inches)				Oil Passage Location (In Inches)		Cavity Dimensions (In Inches)				
	A Dia.	B Cyl. Body Length Max.	C Dia.	†D	E Min.	F Max.	G Min.	H	J	K Dia.	*L Vent Dia. Min.
110059	.812 .815	1.120 1.130	.387 .577	.125 .145	.475	.728	—	—	—	—	.125
110060	1.187 1.190		.572 .911		.427	.710					
110061		1.245 1.255			.437	.787					
110062 110063	1.312 1.315		.572 1.000		.476	.734					
110064 110065	1.750 1.753	1.370 1.380	.760 1.437		.531	.819					
110066 110067	2.125 2.128	1.495 1.505	.885 1.812		.526	.943	.510	.550	1.100	.270 .280	
110068	2.875 2.878	1.620 1.630	1.074 2.500			1.001	.650	.785	1.570		

Note: * Cavity must be vented
† Chamfer to be located at end of bore “A” from which the cylinder will be assembled.

TYPICAL APPLICATIONS FOR PULL CYLINDERS