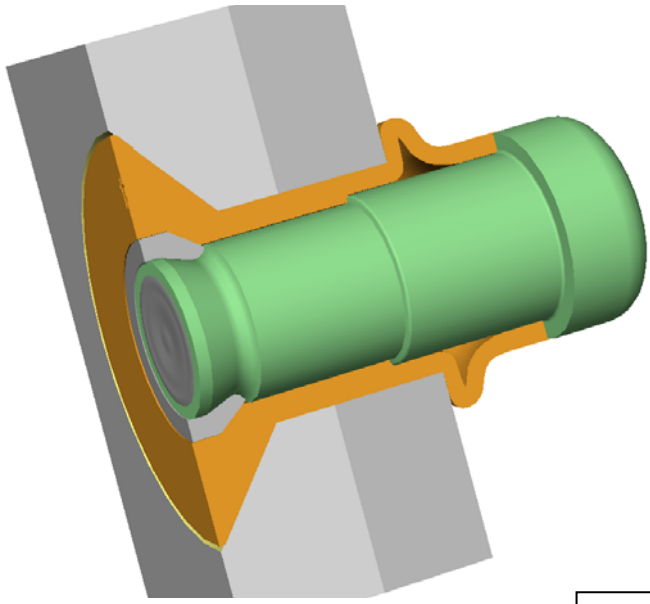
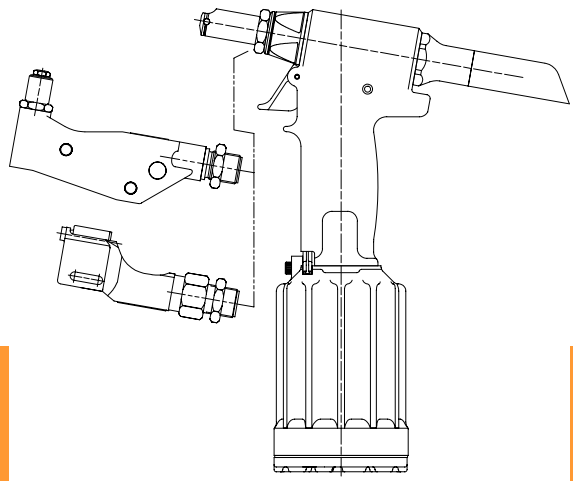
MS BLIND BOLTS

Alloy Steel and
A-286 Stainless





IDEAL for METALLIC and COMPOSITE STRUCTURE

ALCOA

HUCK FASTENERS

AN ALCOA COMPANY

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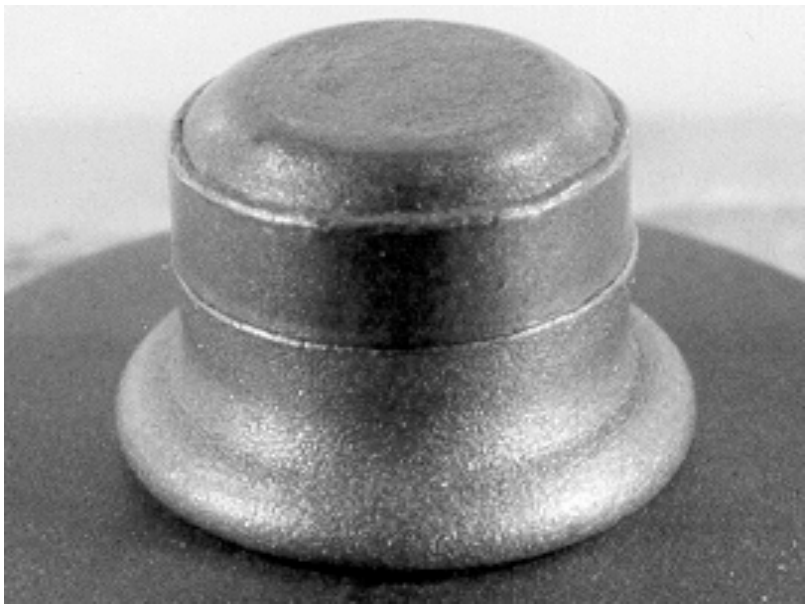


The Huck Blind Bolt system is a service proven high strength blind fastening system, which combines important features of Structural Durability and Fabrication Convenience with Good Economics. The following is a brief summary of the most significant features:

Design, Construction and Function:

The Huck "Unimatic" Blind Bolts are "pull type" high strength blind fasteners consisting of a hollow sleeve, a spindle (or pin) and a lock collar. In addition, the fasteners are available with an optional Drive Washer. During installation, the 3 basic components are locked together and work as a single unit to carry shear, tension and vibration loads.

- The sleeve component is in intimate contact with the structure and absorbs the applied joint loads. It has a "manufactured" head, a hollow shank and a blind side upset.
- The spindle supports the rivet sleeve and shares the joint loads with the sleeve. In addition, the spindle functions as an installation tool to generate sheet take-up, to form the blind side upset, provide joint clamp-up and to set the lock collar.
- During installation, the lock collar is swaged into the lock pocket in the sleeve and the lock groove in the pin, thus locking the sleeve and pin together. This allows the installed components to act as a single fastening unit.
- At the end of the installation cycle, the pin breaks flush with the sleeve head and the (optional) drive washer is discarded.

Materials:

The Blind Bolts are available in 112 ksi alloy steel for highest strength and in 95 ksi A-286 stainless steel for corrosion resistance and elevated temperature service.

Configurations:

The system is available in Flush Tension Head, Flush Shear Head and Protruding Head styles. Diameters range from 5/32" through 1/2" diameter.

Optimized Mechanical Properties of Components:

A combination of selected material, cold working and thermal processing aims at the optimum balance between joint durability, installation convenience and lowest installed costs.

New Optional Drive Washer:

To make the system yet more user friendly in the OEM factories and repair activities, parts can now be ordered with integral Drive Washers. This allows installation with diameter dedicated blunt single action installation tools and in effect provides a new installation nose piece with each fastener. Worries concerning poor installations due to worn installation noses are avoided.

Installation Tooling:

Installation of Huck Blind Bolts is accomplished with a variety of single action "pneudralic" or hydraulic tooling. Huck also offers recently developed ergonomic installation tools, which are designed for minimum operator fatigue and long cycle life. A novel "4 Jaw Pin GripperTM" design offers much improved tool life and improved productivity.

Fastener Standards and Specifications:

The fasteners are manufactured to meet the following industry standards and specifications:

- Standard 100° Flush and Protruding Heads, Alloy Steel: MS90353/90354 and NASM81177.
- Standard 100° Flush and Protruding Heads, Cres: MS21140/21141 and NASM8975.
- Special Configurations, Huck part numbers and procurement specifications.
- Oversize Repair Parts, Huck part numbers and procurement specifications.

The installation schematic shown below illustrates the Blind Bolt with the optional drive washer. The function principle however applies to all Unimatic® blind bolts. If equipped with the optional drive washer, the fasteners can be installed with a blunt nose assembly, yet have the advantage of a new drive anvil with each fastener.

Step 1:
The fastener is inserted into a clearance fit hole. The installation tool engages the pin tail.

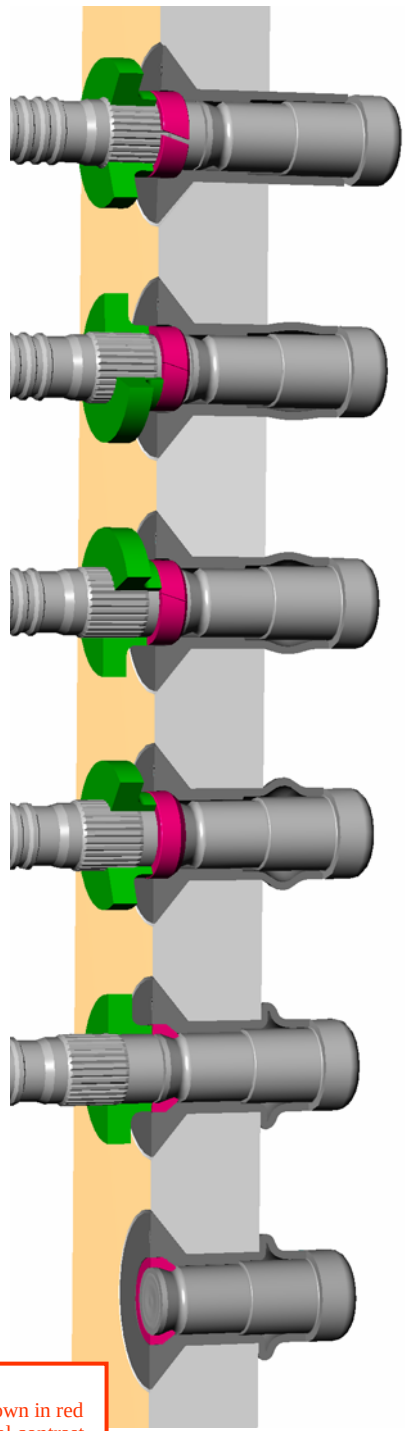
Step 2:
Pulling the trigger starts movement of the spindle. The spindle head contacts the end of the sleeve and the blind side head begins to form. The sleeve bulbing loads are internally absorbed by the sleeve. The pulling load is reacted against the drive washer/lock ring.

Step 3:
The blind side head continues to form.

Step 4:
Continued motion of the spindle starts pulling the sheets together and forming the blind side bulb. The lock collar starts to swage into the lock cavity.

Step 5:
The lock groove on the spindle aligns with the lock pocket in the sleeve, the lock collar is swaged into the lock cavity, locking the assembly together. The pulling load continues to increase and the spindle separates at the break neck.

Step 6:
The spindle break is flush with the sleeve head, the lock is firmly in place, the drive washer is discarded and the installation is complete The entire installation cycle is accomplished in less than 2 seconds.



Note:
Lock collars shown in red to improve visual contrast.

Fastener Identification and Anatomy of Blind Bolt

Head Markings:
Blind Bolts carry the following identification marks:

The symbol ✕ as manufacturer's identification symbol.

Material Code Letter:

Alloy steel components
= No letter

A286 Cres components
= Letter "C"

Grip Identification:

Grip range = Nominal grip ±.031"

Example: Figure "4" head marking
= -4 grip; ranges from .219" to .282"

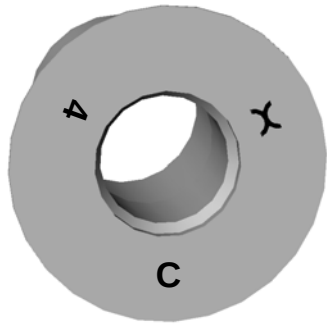
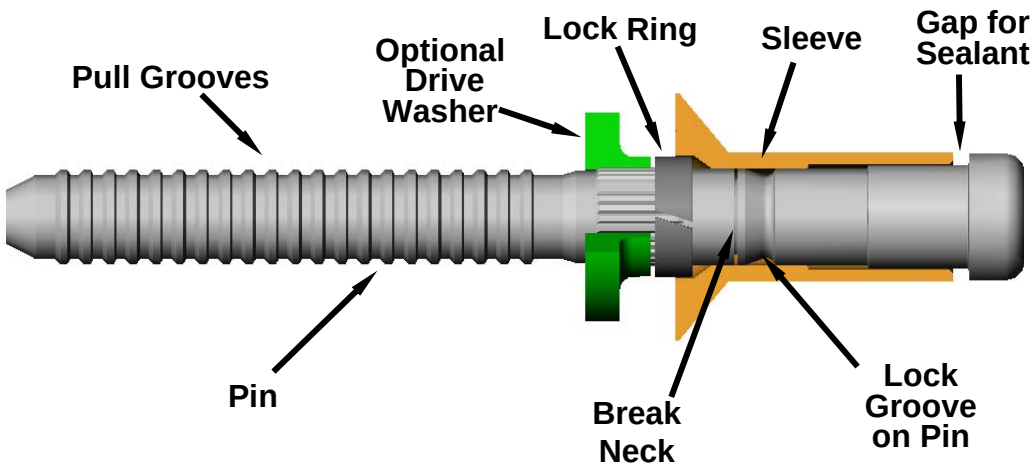
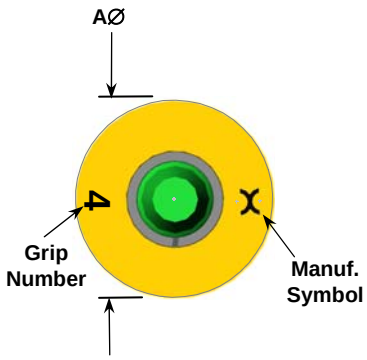


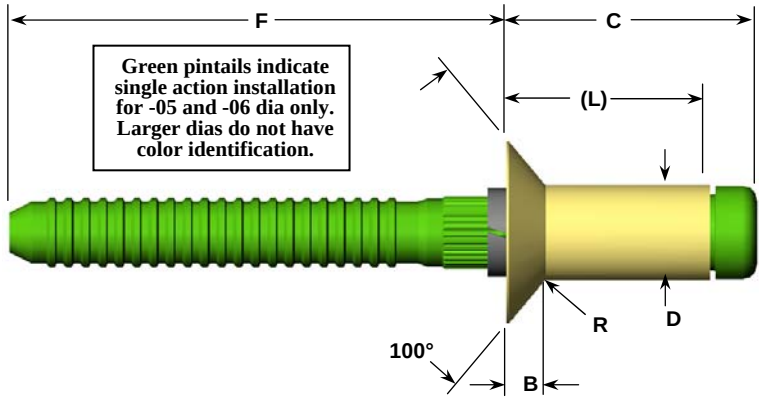
Illustration of head markings on sleeve head of MS21140S0604

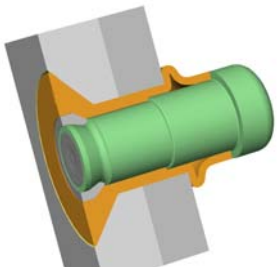
Anatomy of the Huck MS Blind Bolt Family



100° Flush Head --- Alloy Steel--- MS90353U







Dia Dash Number	Basic Dia	øA Max	B Max	øD	F Min	R Rad Max	Single Shear Min	Tensile Min	Hole Limits
-05	5/32	.333	.072	.164 / .162	.844	.010	2,340	1,350	.164 / .167
-06	3/16	.386	.080	.199 / .197	.875	.015	3,450	2,100	.199 / .202
-08	1/4	.507	.105	.260 / .258	1.000	.020	5,900	3,650	.260 / .263
-10	5/16	.634	.137	.312 / .310	1.218	.025	8,500	5,200	.312 / .315
-12	3/8	.762	.165	.374 / .372	1.562	.030	12,200	7,500	.374 / .377
-14	7/16	.890	.193	.437 / .435	1.562	.032	16,700	10,150	.437 / .441
-16	1/2	1.017	.220	.499 / .496	1.562	.035	21,800	13,500	.500 / .504

Part Number Key

MS90353 - 0806 D → 1/4" dia: .375" nominal grip; installed with single action tool.

Code letter "D" denotes IVD Aluminum coating per MIL-C-83488
No Code denotes Cadmium plating per AMS-QQ-P-416
Code letter "W" denotes integral Drive Washer

Grip range number: 06 = .375" ± .031"

Diameter dash number: 08 = .258/.260"

Code "-" denotes installation of -05 and -06 diameter fasteners with double action tool.
Code "-" denotes installation of -08 through -16 diameter fasteners with single action tool.
Code "S" denotes installation of -05 and -06 diameter fasteners with single action tool.
Code "U" denotes installation of all diameter fasteners with single action tool for diameters up to including -12. Diameters -14 and -16 are available in "-" code only.

Basic MS part number for flush head Alloy Steel fasteners.

MS Part Number	Huck Part Number	Installation Tool
MS90353-0604	B100-T06-04	Double Action Tool (Dia -05 & -06 only)
MS90353S0606	SB100-T06-06	Single Action Tool
MS90353U0806	UB100-T08-06	Single Action Tool
MS90353U0806W	UB100-T08-06W	With Drive Washer for single action installation with blunt nose

100° Flush Head --- Alloy Steel--- MS90353U

Fastener Diameter			5/32 (-05)		3/16 (-06)		1/4 (-08)		5/16 (-10)		3/8 (-12)		7/16 (-14)		1/2 (-16)	
Size Dash	Min Grip	Max Grip	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)
-XX02	.094	.157	.280	.434	.303	.479	-	-	-	-	-	-	-	-	-	-
-XX03	.156	.220	.342	.497	.366	.542	.406	.616	-	-	-	-	-	-	-	-
-XX04	.219	.282	.405	.559	.428	.604	.469	.679	.506	.743	.548	.820	-	-	-	-
-XX05	.281	.345	.467	.622	.491	.667	.531	.741	.569	.806	.611	.883	.662	.964	-	-
-XX06	.344	.407	.530	.684	.553	.729	.594	.804	.631	.868	.673	.945	.725	1.027	.815	1.147
-XX07	.406	.470	.592	.747	.616	.792	.656	.866	.694	.931	.736	1.008	.787	1.089	.878	1.210
-XX08	.469	.532	.655	.809	.678	.854	.719	.929	.756	.993	.798	1.070	.850	1.152	.940	1.272
-XX09	.531	.595	.717	.872	.741	.917	.781	.991	.819	1.056	.861	1.133	.912	1.214	1.003	1.335
-XX10	.594	.657	.780	.934	.803	.979	.844	1.054	.881	1.118	.923	1.195	.975	1.277	1.065	1.397
-XX11	.656	.720	.842	.997	.866	1.042	.906	1.116	.944	1.181	.986	1.258	1.037	1.339	1.128	1.460
-XX12	.719	.782	.905	1.059	.928	1.104	.969	1.179	1.006	1.243	1.048	1.320	1.100	1.402	1.190	1.522
-XX13	.781	.845	.967	1.122	.991	1.167	1.031	1.241	1.069	1.306	1.111	1.383	1.162	1.464	1.253	1.585
-XX14	.844	.907	1.030	1.184	1.053	1.229	1.094	1.304	1.131	1.368	1.173	1.445	1.225	1.527	1.315	1.647
-XX15	.906	.970	1.092	1.247	1.116	1.292	1.156	1.366	1.194	1.431	1.236	1.508	1.287	1.589	1.378	1.710
-XX16	.969	1.032	1.155	1.309	1.178	1.354	1.219	1.429	1.256	1.493	1.298	1.570	1.350	1.652	1.440	1.772
-XX17	1.031	1.095			1.241	1.417	1.281	1.491	1.319	1.556	1.361	1.633	1.412	1.714	1.503	1.835
-XX18	1.094	1.157			1.303	1.479	1.344	1.554	1.381	1.618	1.423	1.695	1.475	1.777	1.565	1.897
-XX19	1.156	1.220			1.366	1.542	1.406	1.616	1.444	1.681	1.486	1.758	1.537	1.839	1.628	1.960
-XX20	1.219	1.282			1.428	1.604	1.469	1.679	1.506	1.743	1.548	1.820	1.600	1.902	1.690	2.022
-XX21	1.281	1.345			1.491	1.667	1.531	1.741	1.569	1.806	1.611	1.883	1.662	1.964	1.753	2.085
-XX22	1.344	1.407			1.553	1.729	1.594	1.804	1.631	1.868	1.673	1.945	1.725	2.027	1.815	2.147
-XX23	1.406	1.470			1.616	1.792	1.656	1.866	1.694	1.931	1.736	2.008	1.787	2.089	1.878	2.210
-XX24	1.469	1.532			1.678	1.854	1.719	1.929	1.756	1.993	1.798	2.070	1.850	2.152	1.940	2.272
-XX25	1.531	1.595			1.741	1.917	1.781	1.991	1.819	2.056	1.861	2.133	1.912	2.214	2.003	2.335
-XX26	1.594	1.657			1.803	1.979	1.844	2.054	1.881	2.118	1.923	2.195	1.975	2.277	2.065	2.397
-XX27	1.656	1.720			1.866	2.042	1.906	2.116	1.944	2.181	1.986	2.258	2.037	2.339	2.128	2.460
-XX28	1.719	1.782			1.928	2.104	1.969	2.179	2.006	2.243	2.048	2.320	2.100	2.402	2.190	2.522
-XX29	1.781	1.845					2.031	2.241	2.069	2.306	2.111	2.383	2.162	2.464	2.253	2.585
-XX30	1.844	1.907					2.094	2.304	2.131	2.368	2.173	2.445	2.225	2.527	2.315	2.647
-XX31	1.906	1.970							2.194	2.431	2.236	2.508	2.287	2.589	2.378	2.710
-XX32	1.969	2.032							2.256	2.493	2.298	2.570	2.350	2.652	2.440	2.772
-XX33	2.031	2.095									2.361	2.633	2.412	2.714	2.503	2.835
-XX34	2.094	2.157									2.423	2.695	2.475	2.777	2.565	2.897
-XX35	2.156	2.220									2.486	2.758	2.537	2.839	2.628	2.960
-XX36	2.219	2.282									2.548	2.820	2.600	2.902	2.690	3.022
-XX37	2.281	2.345													2.753	3.085
-XX38	2.344	2.407													2.815	3.147
-XX39	2.406	2.470													2.878	3.210
-XX40	2.469	2.532													2.940	3.272

Materials: Sleeve and serrated pin: Alloy steel per ASTM-A331
Mechanical lock: Carbon steel or A-286 Cres

Coatings: Sleeve and pin: Cadmium Plated (AMS-QQ-P-416) or IVD Aluminum coating (MIL-C-83488)

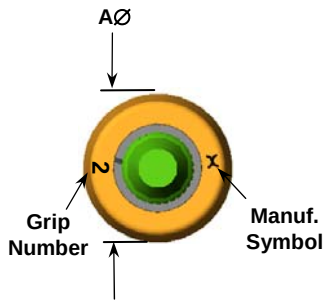
Mechanical Lock: Alloy steel: Cadmium Plated (AMS-QQ-P-416) or IVD Aluminum coating (MIL-C-83488)
A-286 Cres: Passivation treatment (AMS-QQ-P-35)

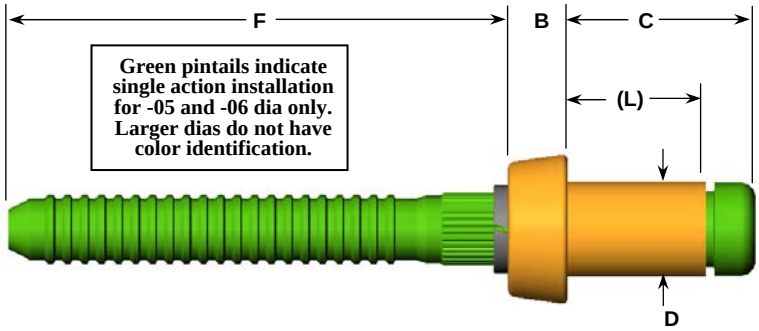
Lubes: None. Manufacturer's option to to lubricate lock component with LOX compatible dry film lube

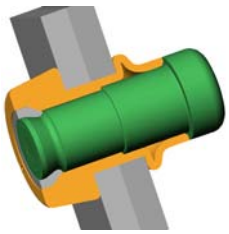
Procurement Specification: NASM81177

Installation Tool Information: NASM81177, Appendix A

Protruding Head --- Alloy Steel--- MS90354U







Dia Dash Number	Basic Dia	øA	B	øD	F Min	Single Shear Min	Tensile Min	Hole Limits
-05	5/32	.272 / .250	.070 / .062	.164 / .162	.844	2,340	1,350	.164 / .167
-06	3/16	.332 / .305	.135 / .125	.199 / .197	.875	3,450	2,100	.199 / .202
-08	1/4	.432 / .400	.140 / .130	.260 / .258	1.000	5,900	3,650	.260 / .263
-10	5/16	.522 / .480	.141 / .131	.312 / .310	1.218	8,500	5,200	.312 / .315
-12	3/8	.627 / .580	.205 / .195	.374 / .372	1.562	12,200	7,500	.374 / .377
-14	7/16	.727 / .675	.207 / .197	.437 / .435	1.562	16,700	10,150	.437 / .441
-16	1/2	.832 / .770	.270 / .260	.499 / .496	1.562	21,800	13,500	.500 / .504

Part Number Key

MS90354 - 0602 D → 3/16" dia: .125" nominal grip; installed with double action tool.

Code letter "D" denotes IVD Aluminum coating per MIL-C-83488
No Code denotes Cadmium plating per AMS-QQ-P-416
Code letter "W" denotes integral Drive Washer

Grip range number: 02 = .125" ± .031"

Diameter dash number: 06 = .197/.199"

Code "-" denotes installation of -05 and -06 diameter fasteners with double action tool.
Code "-" denotes installation of -08 through -16 diameter fasteners with single action tool.
Code "S" denotes installation of -05 and -06 diameter fasteners with single action tool.
Code "U" denotes installation of all diameter fasteners with single action tool for diameters up to including -12. Diameters -14 and -16 are available in "-" code only.

Basic MS part number for protruding head Alloy Steel fasteners

MS Part Number	Huck Part Number	Installation Tool
MS90354-0604	BP-T06-04	Double Action Tool (Dia -05 & -06 only)
MS90354S0606	SBP-T06-06	Single Action Tool
MS90354U0806	UBP-T08-06	Single Action Tool
MS90354U0806W	UBP-T08-06W	With Drive Washer for single action installation w ith blunt nose

Protruding Head --- Alloy Steel--- MS90354U

Fastener Diameter			5/32 (-05)		3/16 (-06)		1/4 (-08)		5/16 (-10)		3/8 (-12)		7/16 (-14)		1/2 (-16)	
Size Dash	Min Grip	Max Grip	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)
-XX01	0.031	0.095	.217	.372	-	-	-	-	-	-	-	-	-	-	-	-
-XX02	.094	.157	.280	.434	.303	.479	.344	.553	.381	.618	.423	.695	-	-	-	-
-XX03	.156	.220	.342	.497	.366	.542	.406	.616	.443	.680	.485	.757	-	-	-	-
-XX04	.219	.282	.405	.559	.428	.604	.469	.679	.506	.743	.548	.820	.599	.901	-	-
-XX05	.281	.345	.467	.622	.491	.667	.531	.741	.569	.806	.611	.883	.662	.964	.753	1.084
-XX06	.344	.407	.530	.684	.553	.729	.594	.804	.631	.868	.673	.945	.725	1.027	.815	1.147
-XX07	.406	.470	.592	.747	.616	.792	.656	.866	.694	.931	.736	1.008	.787	1.089	.878	1.210
-XX08	.469	.532	.655	.809	.678	.854	.719	.929	.756	.993	.798	1.070	.850	1.152	.940	1.272
-XX09	.531	.595	.717	.872	.741	.917	.781	.991	.819	1.056	.861	1.133	.912	1.214	1.003	1.335
-XX10	.594	.657	.780	.934	.803	.979	.844	1.054	.881	1.118	.923	1.195	.975	1.277	1.065	1.397
-XX11	.656	.720	.842	.997	.866	1.042	.906	1.116	.944	1.181	.986	1.258	1.037	1.339	1.128	1.460
-XX12	.719	.782	.905	1.059	.928	1.104	.969	1.179	1.006	1.243	1.048	1.320	1.100	1.402	1.190	1.522
-XX13	.781	.845	.967	1.122	.991	1.167	1.031	1.241	1.069	1.306	1.111	1.383	1.162	1.464	1.253	1.585
-XX14	.844	.907	1.030	1.184	1.053	1.229	1.094	1.304	1.131	1.368	1.173	1.445	1.225	1.527	1.315	1.647
-XX15	.906	.970	1.092	1.247	1.116	1.292	1.156	1.366	1.194	1.431	1.236	1.508	1.287	1.589	1.378	1.710
-XX16	.969	1.032	1.155	1.309	1.178	1.354	1.219	1.429	1.256	1.493	1.298	1.570	1.350	1.652	1.440	1.772
-XX17	1.031	1.095			1.241	1.417	1.281	1.491	1.319	1.556	1.361	1.633	1.412	1.714	1.503	1.835
-XX18	1.094	1.157			1.303	1.479	1.344	1.554	1.381	1.618	1.423	1.695	1.475	1.777	1.565	1.897
-XX19	1.156	1.220			1.366	1.542	1.406	1.616	1.444	1.681	1.486	1.758	1.537	1.839	1.628	1.960
-XX20	1.219	1.282			1.428	1.604	1.469	1.679	1.506	1.743	1.548	1.820	1.600	1.902	1.690	2.022
-XX21	1.281	1.345			1.491	1.667	1.531	1.741	1.569	1.806	1.611	1.883	1.662	1.964	1.753	2.085
-XX22	1.344	1.407			1.553	1.729	1.594	1.804	1.631	1.868	1.673	1.945	1.725	2.027	1.815	2.147
-XX23	1.406	1.470			1.616	1.792	1.656	1.866	1.694	1.931	1.736	2.008	1.787	2.089	1.878	2.210
-XX24	1.469	1.532			1.678	1.854	1.719	1.929	1.756	1.993	1.798	2.070	1.850	2.152	1.940	2.272
-XX25	1.531	1.595			1.741	1.917	1.781	1.991	1.819	2.056	1.861	2.133	1.912	2.214	2.003	2.335
-XX26	1.594	1.657			1.803	1.979	1.844	2.054	1.881	2.118	1.923	2.195	1.975	2.277	2.065	2.397
-XX27	1.656	1.720			1.866	2.042	1.906	2.116	1.944	2.181	1.986	2.258	2.037	2.339	2.128	2.460
-XX28	1.719	1.782			1.928	2.104	1.969	2.179	2.006	2.243	2.048	2.320	2.100	2.402	2.190	2.522
-XX29	1.781	1.845					2.031	2.241	2.069	2.306	2.111	2.383	2.162	2.464	2.253	2.585
-XX30	1.844	1.907					2.094	2.304	2.131	2.368	2.173	2.445	2.225	2.527	2.315	2.647
-XX31	1.906	1.970							2.194	2.431	2.236	2.508	2.287	2.589	2.378	2.710
-XX32	1.969	2.032							2.256	2.493	2.298	2.570	2.350	2.652	2.440	2.772
-XX33	2.031	2.095									2.361	2.633	2.412	2.714	2.503	2.835
-XX34	2.094	2.157									2.423	2.695	2.475	2.777	2.565	2.897
-XX35	2.156	2.220									2.486	2.758	2.537	2.839	2.628	2.960
-XX36	2.219	2.282									2.548	2.820	2.600	2.902	2.690	3.022
-XX37	2.281	2.345													2.753	3.085
-XX38	2.344	2.407													2.815	3.147
-XX39	2.406	2.470													2.878	3.210
-XX40	2.469	2.532													2.940	3.272

Materials: Sleeve and serrated pin: Alloy steel per ASTM-A331
Mechanical lock: Carbon steel or A-286 Cres

Coatings: Sleeve and pin: Cadmium Plated (AMS-QQ-P-416) or IVD Aluminum coating (MIL-C-83488)

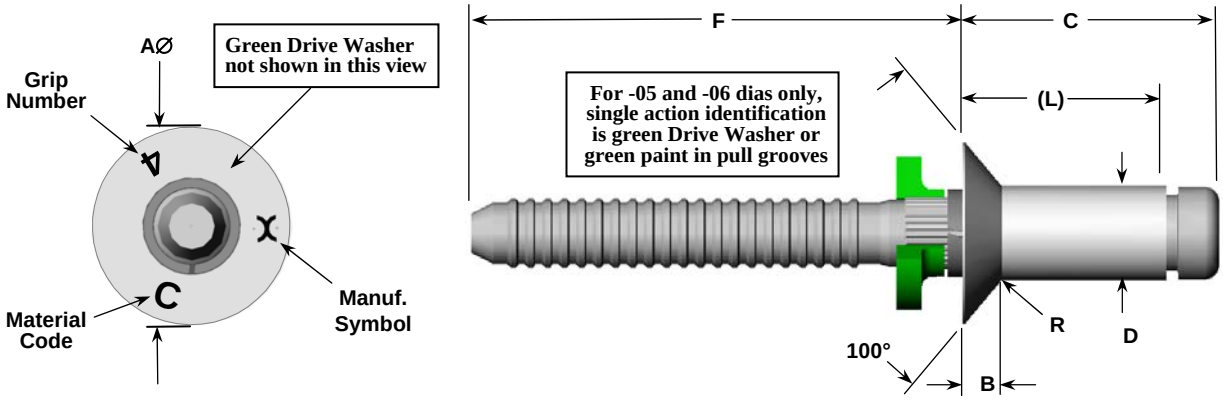
Mechanical Lock: Alloy steel: Cadmium Plated (AMS-QQ-P-416) or IVD Aluminum coating (MIL-C-83488)
A-286 Cres: Passivation treatment (AMS-QQ-P-35)

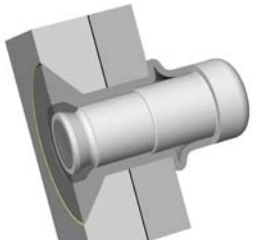
Lubes: None. Manufacturer's option to to lubricate lock component with LOX compatible dry film lube

Procurement Specification: NASM81177

Installation Tool Information: NASM81177, Appendix A

100° Flush Head --- A-286 CRES--- MS21140U





Dia Dash Number	Basic Dia	øA Max	B Max	øD	F Min	R Rad Max	Single Shear Min	Tensile Min	Hole Limits
-05	5/32	.334	.074	.164 / .162	.844	.010	1,980	1,150	.164 / .167
-06	3/16	.387	.082	.199 / .197	.875	.015	2,925	1,690	.199 / .202
-08	1/4	.508	.108	.260 / .258	1.000	.020	5,000	2,900	.260 / .263
-10	5/16	.635	.140	.312 / .310	1.218	.025	7,200	4,170	.312 / .315
-12	3/8	.762	.068	.374 / .372	1.562	.030	10,380	5,970	.374 / .377

Part Number Key

MS21140 - 0604 P → 3/16" dia: .250" nominal grip; installed with double action tool.

Code letter "P" denotes Cadmium plating
Code letter "L" denotes longer pintail
Code letter "W" denotes integral Drive Washer
No code letter denotes passivation treatment

Grip range number 04 = .250" ± .031"

Diameter dash number 06 = .197/.199"

Code " - " denotes installation of -05 and -06 diameter fasteners with double action tool.
Code " - " denotes installation of -08 through -12 diameter fasteners with single action tool.
Code "S" denotes installation of -05 and -06 diameter fasteners with single action tool.
Code "U" denotes installation of all diameter fasteners with single action tool.

Basic MS part number for flush head CRES fasteners.

MS Part Number	Huck Part Number	Installation Tool
MS21140-0604	B100-EU06-04	Double Action Tool (Dia -05 & -06 only)
MS21140S0606	SB100-EU06-06	Single Action Tool
MS21140U0806	UB100-EU08-06	Single Action Tool
MS21140U0806W	UB100-EU08-06W	With Drive Washer for single action installation w ith blunt nose

100° Flush Head --- A-286 CRES--- MS21140U

Fastener Diameter			5/32 (-05)		3/16 (-06)		1/4 (-08)		5/16 (-10)		3/8 (-12)	
Size Dash	Min Grip	Max Grip	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)
-XX01	.031	.095	.217	.372	-	-	-	-	-	-	-	-
-XX02	.094	.157	.280	.434	.303	.479	.344	.553	.381	.618	.423	.695
-XX03	.156	.220	.342	.497	.366	.542	.406	.616	.443	.680	.485	.757
-XX04	.219	.282	.405	.559	.428	.604	.469	.679	.506	.743	.548	.820
-XX05	.281	.345	.467	.622	.491	.667	.531	.741	.569	.806	.611	.883
-XX06	.344	.407	.530	.684	.553	.729	.594	.804	.631	.868	.673	.945
-XX07	.406	.470	.592	.747	.616	.792	.656	.866	.694	.931	.736	1.008
-XX08	.469	.532	.655	.809	.678	.854	.719	.929	.756	.993	.798	1.070
-XX09	.531	.595	.717	.872	.741	.917	.781	.991	.819	1.056	.861	1.133
-XX10	.594	.657	.780	.934	.803	.979	.844	1.054	.881	1.118	.923	1.195
-XX11	.656	.720	.842	.997	.866	1.042	.906	1.116	.944	1.181	.986	1.258
-XX12	.719	.782	.905	1.059	.928	1.104	.969	1.179	1.006	1.243	1.048	1.320
-XX13	.781	.845	.967	1.122	.991	1.167	1.031	1.241	1.069	1.306	1.111	1.383
-XX14	.844	.907	1.030	1.184	1.053	1.229	1.094	1.304	1.131	1.368	1.173	1.445
-XX15	.906	.970	1.092	1.247	1.116	1.292	1.156	1.366	1.194	1.431	1.236	1.508
-XX16	.969	1.032	1.155	1.309	1.178	1.354	1.219	1.429	1.256	1.493	1.298	1.570
-XX17	1.031	1.095	1.217	1.372	1.241	1.417	1.281	1.491	1.319	1.556	1.361	1.633
-XX18	1.094	1.157	1.280	1.434	1.303	1.479	1.344	1.554	1.381	1.618	1.423	1.695
-XX19	1.156	1.220	1.342	1.497	1.366	1.542	1.406	1.616	1.444	1.681	1.486	1.758
-XX20	1.219	1.282	1.405	1.559	1.428	1.604	1.469	1.679	1.506	1.743	1.548	1.820
-XX21	1.281	1.345	1.467	1.622	1.491	1.667	1.531	1.741	1.569	1.806	1.611	1.883
-XX22	1.344	1.407	1.530	1.684	1.553	1.729	1.594	1.804	1.631	1.868	1.673	1.945
-XX23	1.406	1.470	1.592	1.747	1.616	1.792	1.656	1.866	1.694	1.931	1.736	2.008
-XX24	1.469	1.532	1.655	1.809	1.678	1.854	1.719	1.929	1.756	1.993	1.798	2.070
-XX25	1.531	1.595	1.717	1.872	1.741	1.917	1.781	1.991	1.819	2.056	1.861	2.133
-XX26	1.594	1.657			1.803	1.979	1.844	2.054	1.881	2.118	1.923	2.195
-XX27	1.656	1.720					1.906	2.116	1.944	2.181	1.986	2.258
-XX28	1.719	1.782					1.969	2.179	2.006	2.243	2.048	2.320
-XX29	1.781	1.845					2.031	2.241	2.069	2.306	2.111	2.383
-XX30	1.844	1.907									2.173	2.445
-XX31	1.906	1.970									2.236	2.508
-XX32	1.969	2.032									2.298	2.570
-XX33	2.031	2.095									2.361	2.633
-XX34	2.094	2.157									2.423	2.695
-XX35	2.156	2.220									2.486	2.758
-XX36	2.219	2.282									2.548	2.820

Materials: Sleeve and serrated pin: A-286 CRES per AMS5737
Mechanical lock: A-286 CRES or 316 CRES.

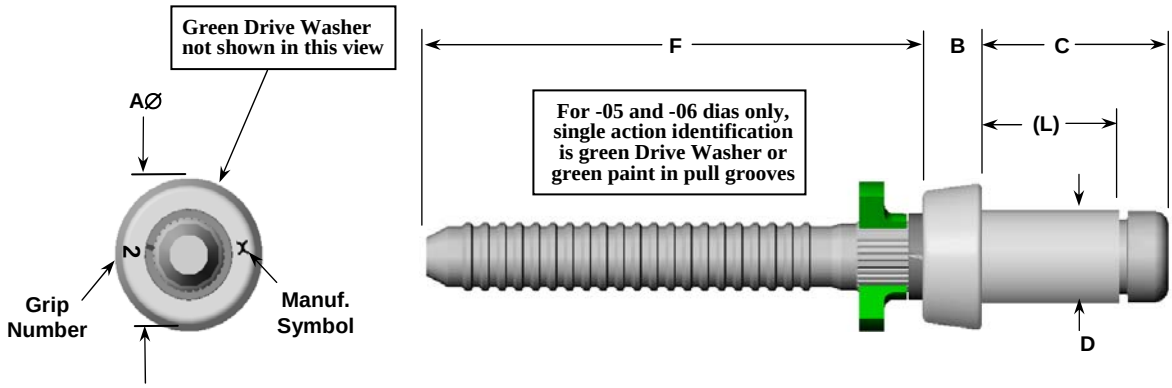
Coatings: Sleeve: Passivation treatment (AMS-QQ-P-35) or Cadmium plating (AMS-QQ-P-416) or IVD Aluminum coating (MIL-C-83488)
Pin: Passivation treatment (AMS-QQ-P-35)
Mechanical Lock: Passivation treatment (AMS-QQ-P-35)

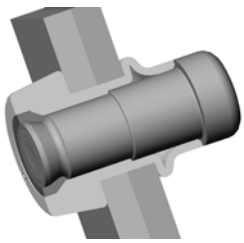
Lubes: None or lube per AS7272, MIL-L-87132 or DOD-L-85645 at Manufacturer's option

Procurement Specification: NASM8975

Installation Tool Information: NASM8975, Appendix A

Protruding Head --- A-286 CRES--- M21141U





Dia Dash Number	Basic Dia	øA	B	øD	F Min	Single Shear Min	Tensile Min	Hole Limits
-05	5/32	.272 / .250	.070 / .058	.164 / .162	.844	1,980	1,150	.164 / .167
-06	3/16	.332 / .305	.135 / .120	.199 / .197	.875	2,925	1,690	.199 / .202
-08	1/4	.432 / .400	.140 / .120	.260 / .258	1.000	5,000	2,900	.260 / .263
-10	5/16	.522 / .480	.141 / .131	.312 / .310	1.218	7,200	4,170	.312 / .315
-12	3/8	.627 / .580	.205 / .195	.374 / .372	1.562	10,380	5,970	.374 / .377

Part Number Key

MS21141 - 0604 P → 3/16" dia: .250" nominal grip; installed with double action tool.

Code letter "P" denotes Cadmium plating
Code letter "L" denotes longer pintail
Code letter "W" denotes integral Drive Washer
No code letter denotes passivation treatment

Grip range number 04 = .250" ± .031"

Diameter dash number 06 = .197/.199"

Code " - " denotes installation of -05 and -06 diameter fasteners with double action tool.
Code " - " denotes installation of -08 through -12 diameter fasteners with single action tool.
Code "S" denotes installation of -05 and -06 diameter fasteners with single action tool.
Code "U" denotes installation of all diameter fasteners with single action tool.

Basic MS part number for protruding head CRES fasteners.

MS Part Number	Huck Part Number	Installation Tool
MS21141-0604	BP-EU06-04	Double Action Tool (Dia -05 & -06 only)
MS21141S0605	SBP-EU06-05	Single Action Tool
MS21141U0806	UBP-EU08-06	Single Action Tool
MS21141U0606W	UBP-EU06-06W	With Drive Washer for single action installation w ith blunt nose

Protruding Head --- A-286 CRES--- M21141U

Fastener Diameter			5/32 (-05)		3/16 (-06)		1/4 (-08)		5/16 (-10)		3/8 (-12)	
Size Dash	Min Grip	Max Grip	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)	L (Ref)	C (Max)
-XX01	.031	.095	.217	.372	-	-	-	-	-	-	-	-
-XX02	.094	.157	.280	.434	.303	.479	.344	.553	.381	.618	.423	.695
-XX03	.156	.220	.342	.497	.366	.542	.406	.616	.443	.680	.485	.757
-XX04	.219	.282	.405	.559	.428	.604	.469	.679	.506	.743	.548	.820
-XX05	.281	.345	.467	.622	.491	.667	.531	.741	.569	.806	.611	.883
-XX06	.344	.407	.530	.684	.553	.729	.594	.804	.631	.868	.673	.945
-XX07	.406	.470	.592	.747	.616	.792	.656	.866	.694	.931	.736	1.008
-XX08	.469	.532	.655	.809	.678	.854	.719	.929	.756	.993	.798	1.070
-XX09	.531	.595	.717	.872	.741	.917	.781	.991	.819	1.056	.861	1.133
-XX10	.594	.657	.780	.934	.803	.979	.844	1.054	.881	1.118	.923	1.195
-XX11	.656	.720	.842	.997	.866	1.042	.906	1.116	.944	1.181	.986	1.258
-XX12	.719	.782	.905	1.059	.928	1.104	.969	1.179	1.006	1.243	1.048	1.320
-XX13	.781	.845	.967	1.122	.991	1.167	1.031	1.241	1.069	1.306	1.111	1.383
-XX14	.844	.907	1.030	1.184	1.053	1.229	1.094	1.304	1.131	1.368	1.173	1.445
-XX15	.906	.970	1.092	1.247	1.116	1.292	1.156	1.366	1.194	1.431	1.236	1.508
-XX16	.969	1.032	1.155	1.309	1.178	1.354	1.219	1.429	1.256	1.493	1.298	1.570
-XX17	1.031	1.095	1.217	1.372	1.241	1.417	1.281	1.491	1.319	1.556	1.361	1.633
-XX18	1.094	1.157	1.280	1.434	1.303	1.479	1.344	1.554	1.381	1.618	1.423	1.695
-XX19	1.156	1.220	1.342	1.497	1.366	1.542	1.406	1.616	1.444	1.681	1.486	1.758
-XX20	1.219	1.282	1.405	1.559	1.428	1.604	1.469	1.679	1.506	1.743	1.548	1.820
-XX21	1.281	1.345	1.467	1.622	1.491	1.667	1.531	1.741	1.569	1.806	1.611	1.883
-XX22	1.344	1.407	1.530	1.684	1.553	1.729	1.594	1.804	1.631	1.868	1.673	1.945
-XX23	1.406	1.470	1.592	1.747	1.616	1.792	1.656	1.866	1.694	1.931	1.736	2.008
-XX24	1.469	1.532	1.655	1.809	1.678	1.854	1.719	1.929	1.756	1.993	1.798	2.070
-XX25	1.531	1.595	1.717	1.872	1.741	1.917	1.781	1.991	1.819	2.056	1.861	2.133
-XX26	1.594	1.657			1.803	1.979	1.844	2.054	1.881	2.118	1.923	2.195
-XX27	1.656	1.720					1.906	2.116	1.944	2.181	1.986	2.258
-XX28	1.719	1.782					1.969	2.179	2.006	2.243	2.048	2.320
-XX29	1.781	1.845					2.031	2.241	2.069	2.306	2.111	2.383
-XX30	1.844	1.907									2.173	2.445
-XX31	1.906	1.970									2.236	2.508
-XX32	1.969	2.032									2.298	2.570
-XX33	2.031	2.095									2.361	2.633
-XX34	2.094	2.157									2.423	2.695
-XX35	2.156	2.220									2.486	2.758
-XX36	2.219	2.282									2.548	2.820

Materials: Sleeve and serrated pin: A-286 CRES per AMS5737
Mechanical lock: A-286 CRES or 316 CRES.

Coatings: Sleeve: Passivation treatment (AMS-QQ-P-35) or Cadmium plating (AMS-QQ-P-416) or IVD Aluminum coating (MIL-DTL-83488)
Pin: Passivation treatment (AMS-QQ-P-35)
Mechanical Lock: Passivation treatment (AMS-QQ-P-35)

Lubes: None or lube per AS7272, MIL-L-87132 or DOD-L-85645 at Manufacturer's option

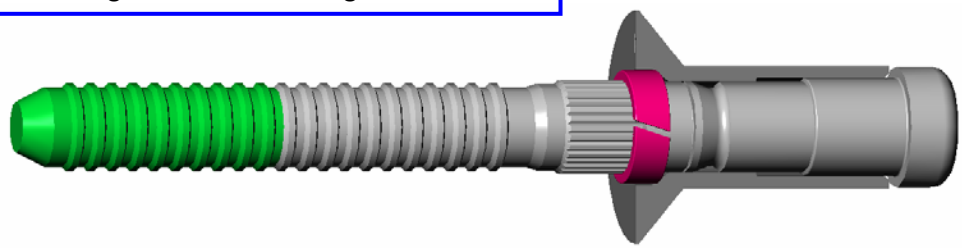
Procurement Specification: NASM8975

Installation Tool Information: NASM8975, Appendix A

Visual Impressions of the Huck Blind Bolt Family

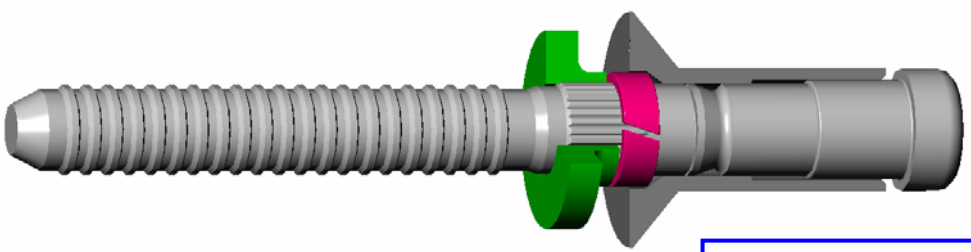
Basic “Unimatic” style: Green dye on pintail. All diameters installed with traditional “Single Action” tooling.

Configuration typical for alloy steel and CRES parts.



Traditional “Double Action” style: Identical in configuration except no green dye on pintail. -05 and -06 dia are installed with “Double Action” tooling.

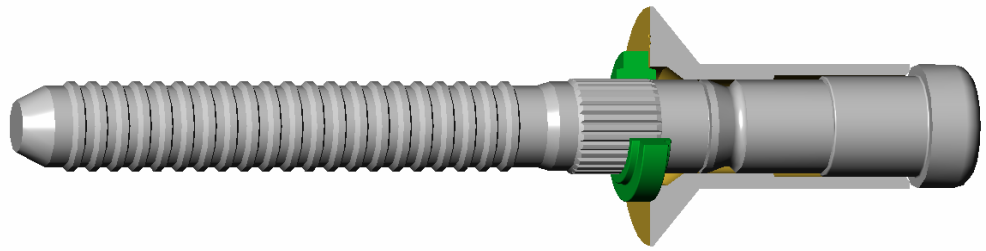
Basic “Unimatic” style with integral “Drive Washer”. Installed with blunt nose “Single Action” tooling.



Configuration typical for alloy steel and CRES parts.

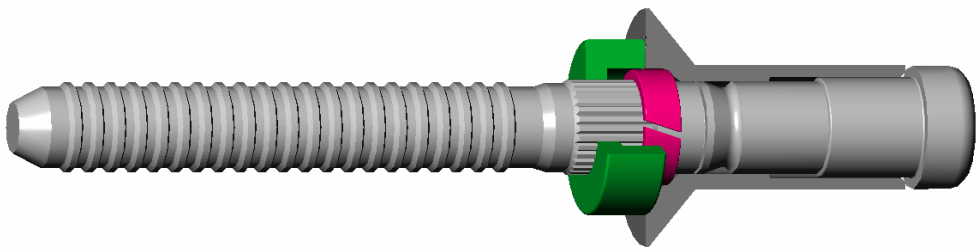
Visual Impressions of the Huck Blind Bolt Family

Traditional “Single Action Shear Flange” style:
Installed with traditional “Single Action” tooling.



Typical for some alloy steel parts.

Traditional “Single Action Shear Cap” style:
Installed with traditional “Single Action” tooling.

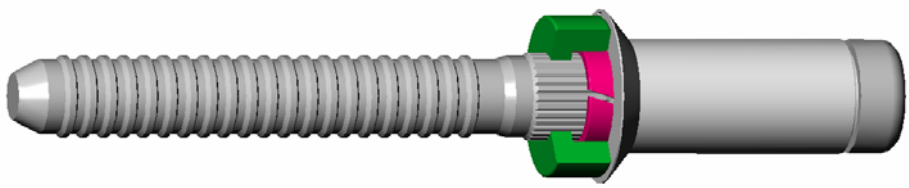


Typical for some CRES parts.

Special Configurations

Huck Blind Bolts are also available in special configurations such as Oversize Diameter and Shear Heads. The most popular part number families are shown in the table below. For additional specials, call Huck International.

Standard MS Part Number	Equivalent Huck Part Number		!st Oversize Part Number	2nd Oversize Part Number		Nominal Dia Shear Head Part Number
MS90353-( )( )	B100-T		OB100-T	O9B100-T		7B100-T
MS90353S( )( )	SB100-T		OSB100-T			S7B100-T
MS90353U( )( )	UB100-T					
MS90354-( )( )	BP-T		OBP-T			
MS90354S( )( )	SBP-T		OSBP-T			
MS90354U( )( )	UBP-T					
MS21140-( )( )	B100-EU		OB100-EU			7B100-EU
MS21140-( )( )	SB100-EU		OSB100-EU			S7B100-EU
MS21140-( )( )	UB100-EU		OUB100-EU			
MS21141-( )( )	BP-EU		OBP-EU			
MS21141-( )( )	SBP-EU		OSBP-EU			
MS21141-( )( )	UBP-EU		OUBP-EU			



Huck SHEAR HEAD Blind Bolt S7B100-EU06-04

with shear cap for single action installation

Recommendations for Hole Preparation and Installation

Hole Preparation:

Drill sizes should be chosen to generate holes within the hole diameter limits recommended in the table below. If holes are drilled at the low limit, or if sealant is used in assembly, pins sometimes break low and installations are incomplete. An easy remedy is to drill the holes slightly larger (within the recommended limits). This provides a little extra space for sealant trapped in the holes.

Dias	Hole Dia	Recommended Drill Sizes	Recommended Reamer Sizes
-5	.164/.167	#19; 4.2mm	
-6	.199/.202	#8; 5.1mm	
-8	.260/.263	"G"; 6.6mm	
-10	.312/.315	5/16; 7.95mm	
-12	.374/.377	3/8; 9.5mm	
-14	.437/.441	7/16; 11.1mm	
-16	.500/.504	1/2; 12.7mm	
-5 O/S	.180/.183		.181; 4.6mm
-6 O/S	.215/.218		.216; 5.5mm
-8 O/S	.276/.279	Oversize Fasteners are intended for repair only	.277; 7.04mm
-10 O/S	.328/.331		.329; 8.35mm
-12 O/S	.390/.393		.391; 9.93mm
-14 O/S	.453/.457		.454; 11.53mm

Suggestions on good Hole Preparation Practice:

Clean round holes within tolerance and with minimal burrs are fundamental to good rivet performance. Below are a few suggestions, which should help to achieve good installations:

- Drills should be sharp. Optimized drill point geometry has surprising benefits for hole quality, productivity and minimizing operator fatigue.
- Drill speeds are critical to achieve hole quality and productivity:
  - For Aluminum structure, drill speeds of 4,000 to 6,000 RPM are recommended.
  - For stainless or titanium structure, drill speeds of 300 to 1,000 RPM are recommended.
  - For composite structure carbide cutters are recommended.
- Excessive “push” on the drill motor can create sheet separation and burrs.
- Hole normality is important. Angularity beyond 2° may cause gaps under the heads and should be avoided.
- Clamping of the structure with temporary devices is very helpful.
- Countersink concentricity is important. Undersize pilots are a common cause of eccentricity problems and cosmetic issues.
- The rivet installation tool should be properly aligned and firmly pushed against the structure. This helps to avoid minor sheet gapping due to misalignment and/or presence of sealant.
- The trigger must be depressed until pin break indicates completion of the installation cycle.
- Worn and dirty tools can cause bad installations. Of particular importance are the gripping jaws; worn and dirty jaws can cause slipping of the jaws and breaking in the pintails.

INSTALLATION TOOLING

Models 202, 244 & 2025 Guns			
Bolt dia	Short	Standard	Long
-05	99-2700	99-2701	99-2702
-06	99-2706	99-2707	99-2708
-08	99-2712	99-2713	99-2714

Models 202, 244 & 2025 are new ergonomic lightweight tools

Note: Models 202 & 244 will not pull -8 diameter

Models 245 & 246 Guns			
Bolt dia	Short	Standard	Long
-08	99-2715	99-2716	99-2717
-10	99-2718	99-2719	99-2720
-12	99-2721	99-2722	99-2723

Note: Model 245 will not pull -12 diameter

Note: Blunt Cherry tools will not install Huck Blind Bolts. Exception:All Blind Bolts with Drive Washers are installed with BLUNT tools.

Models 5901 & A5901 Guns	
Bolt dia	Standard
-12	H99-599
-14	H99-738
-16	H99-678

Note: Models 5901 & A5901 are hydraulic tools, which require a hydraulic power source

Note: The tools shown above are recommended as most current and best suitable to install blind bolts. Some older tools, if in inventory, may be used also, but are not recommended for new purchase. For additional hydraulic tools, contact Huck Installation Tool Division at (800) 635-8320

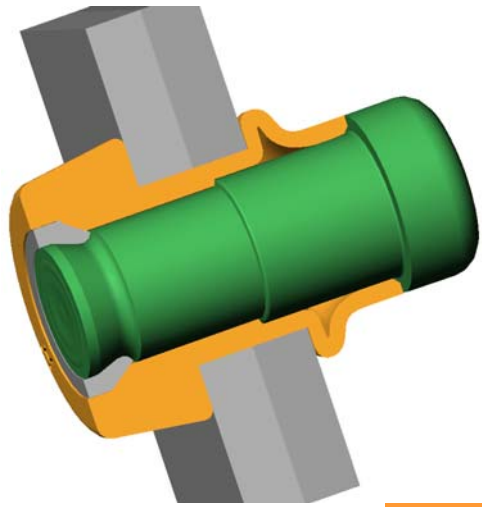
OFFSET TOOLING

Hydraulic Power Tool Model 206-375		
Rivet dia	$1\frac{1}{4}$" Offset	$1\frac{7}{8}$" Offset
-05	99-1712	99-1712-1
-06	99-1713	99-1712-1
-08	99-1714	99-1714-1

Huck Blind Fasteners and Installation Tools

are offered through Huck authorized Distributors

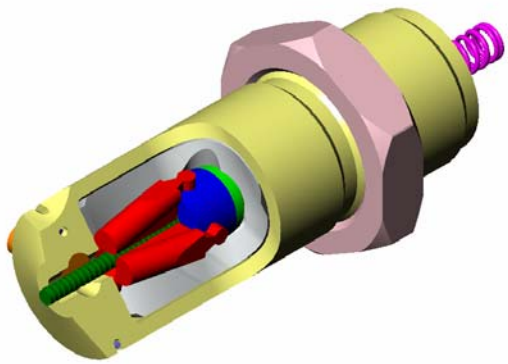
For a list of authorized Distributors please contact **Huck International Tucson, AZ. 800-234-4825**



Huck International

Blind Fastener Division
Tucson, AZ.
800-234-4825

Installation Tool Division
Kingston, NY.
800-635-8320



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