

# The Huck UNIMATIC® Blind Rivet Catalog



**Huck  
Fasteners**

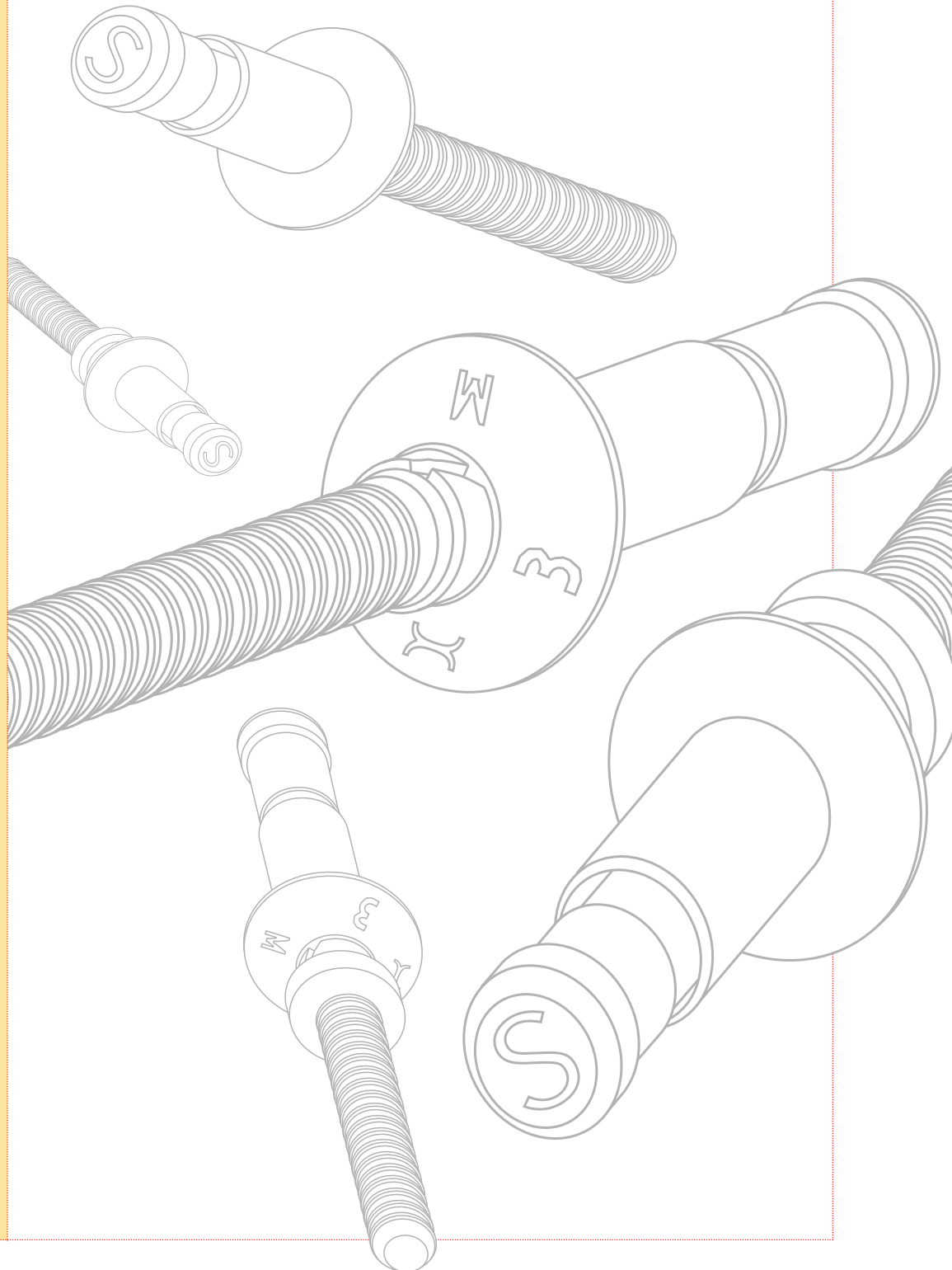
From Cordant Technologies

## The Ultimate Fastening System

The Huck UNIMATIC blind rivet is a general purpose, bulbed blind head, mechanically locked spindle, hole filling fastener for aerospace applications.

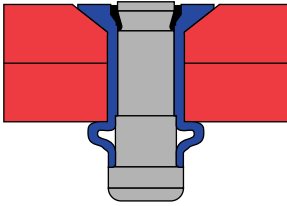
### Key Features:

- Positive mechanical spindle lock.
- Large bearing blind side head.
- Single action installation.
- Mechanical hole fill.
- Vibration resistant.
- NAS industry standards.
- Published MIL-HDBK-5 allowables.
- Flush spindle break at installation.
- Available drive washer option for multiple diameter installations with one tool.
- Surface finish options available.
- Oversize repair fasteners available.
- Available in lightweight Aluminum.
- Available in corrosion resistant Monel.
- Available in high strength high temperature A286.



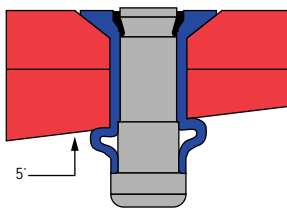
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#### Cross Section View

This installed and cross sectioned UNIMATIC Blind Rivet illustrates the positive lock and wide bearing bulbed blind head.



#### Blind Side Angle

UNIMATIC Blind Rivets can be installed on blind side sloped surfaces up to 5° without loss of mechanical performance.

The Huck UNIMATIC Blind Rivet System combines many important features, which develop optimal joint characteristics along with most convenient field installation. Over the years, several product refinements helped to continuously update the product.

#### Materials

The Huck Unimatic blind rivet system is available in all-Aluminum for lightest weight, Monel for improved corrosion resistance and A-286 for highest strength and elevated temperature applications.

#### Bulbed Foot Print

The generous foot print is ideal for applications in thick or thin, metallic and non-metallic structure. It may be installed on blind side slopes up to 5° without loss of performance.

#### Hole Fill Feature

The system has a mechanical hole filling mechanism in the “heart of the line” product sizes. This is accomplished by means of a “sizing lobe” on the rivet spindle. As the rivet is driven, the lobe forces hole fill throughout the thickness of the structure. This feature enhances joint allowables in ultimate and yield strength.

#### Optimized Mechanical Properties Of Components

A combination of selected materials, cold working and thermal processing targets the optimum balance between joint performance and functional reliability in each of the 3 basic material combinations.

#### Joint Strength

The targeted combination of the above features culminates in a blind rivet system with highest joint allowables and highest strength to weight ratios in its class. Joint data are published in MIL-HDBK-5.

#### Drive Washer

To enhance installation convenience in the factories and repair activities, the time proven system is now available with integral “drive washers”. Each rivet has in effect a new drive anvil. This new feature allows installation of multiple diameters with one and the same installation nose attachment and eliminates concerns about tool wear.

#### NAS Part Number System

The Huck Unimatic blind rivet system is covered under NAS1919/1921 with NAS 1900 as the procurement specification. Rivets with integral drive washers are covered with code letter “U” in NAS1919/1921. These documents describe all significant product features in detail.

#### Oversize Repair Rivets

Oversize rivets (1/64” o/s) are available in all materials and sizes under Huck part numbers. The table below shows examples of “nominal” to corresponding “oversize” cross reference. Countersink diameters for “nominal” and 1/64” o/s parts are the same and need no rework. Only the hole diameters need to be reamed to the o/s diameters.

Original Part	Oversize Repair Part
NAS1919B04S02	OSMLSP-B04-02
NAS1921M05S03	OSMLS100-M05-03
NAS1921C06S04	OSMLS100-C06-04

#### Specials

Certain sizes and materials are available in reduced shear head style (NAS1097) for special applications in the traditional Huck “MLS” double action configuration or with the optional drive washer for single action installation.

### Design and Construction

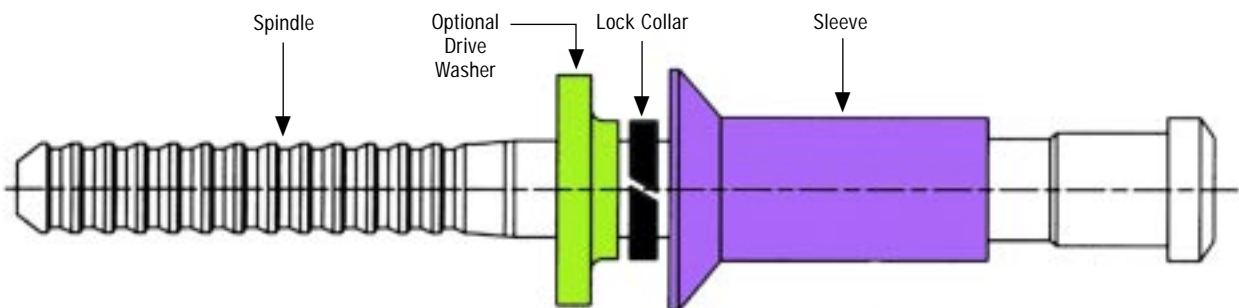
The UNIMATIC blind rivet consists of 3 basic components, the rivet sleeve, the spindle (or pin) and the lock collar. An optional 4th component is the drive washer, which allows installation of the rivet with a blunt tool. For rivets with the optional drive washer, one and the same blunt tool installs -4, -5 & -6 diameter rivets. The 3 basic components are locked together and work as a single unit to carry shear loads, tension loads and vibration loads.

**The sleeve** component is in intimate contact with the structure and absorbs the applied joint loads. It has a rivet head, a shank and the backside upset analogous with a typical solid rivet.

**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 hole fill and to form the blind side upset.

**The lock collar** is swaged into a retention groove in the sleeve and the pin, which mechanically locks the assembly together. This allows the components to act as a single unit.

**The optional drive washer** is an installation aid and is discarded at completion of the installation cycle.



## Installation Sequence [ *traditional* ]

The Installation schematic shown below applies to the traditional UNIMATIC (single action) rivets. Each rivet diameter requires a separate nose assembly.

### Step One

The rivet is placed into the prepared hole with clearance. The installation tool engages the pintail and the cycle begins. The pulling load is reacted against the lock collar.

### Step Two

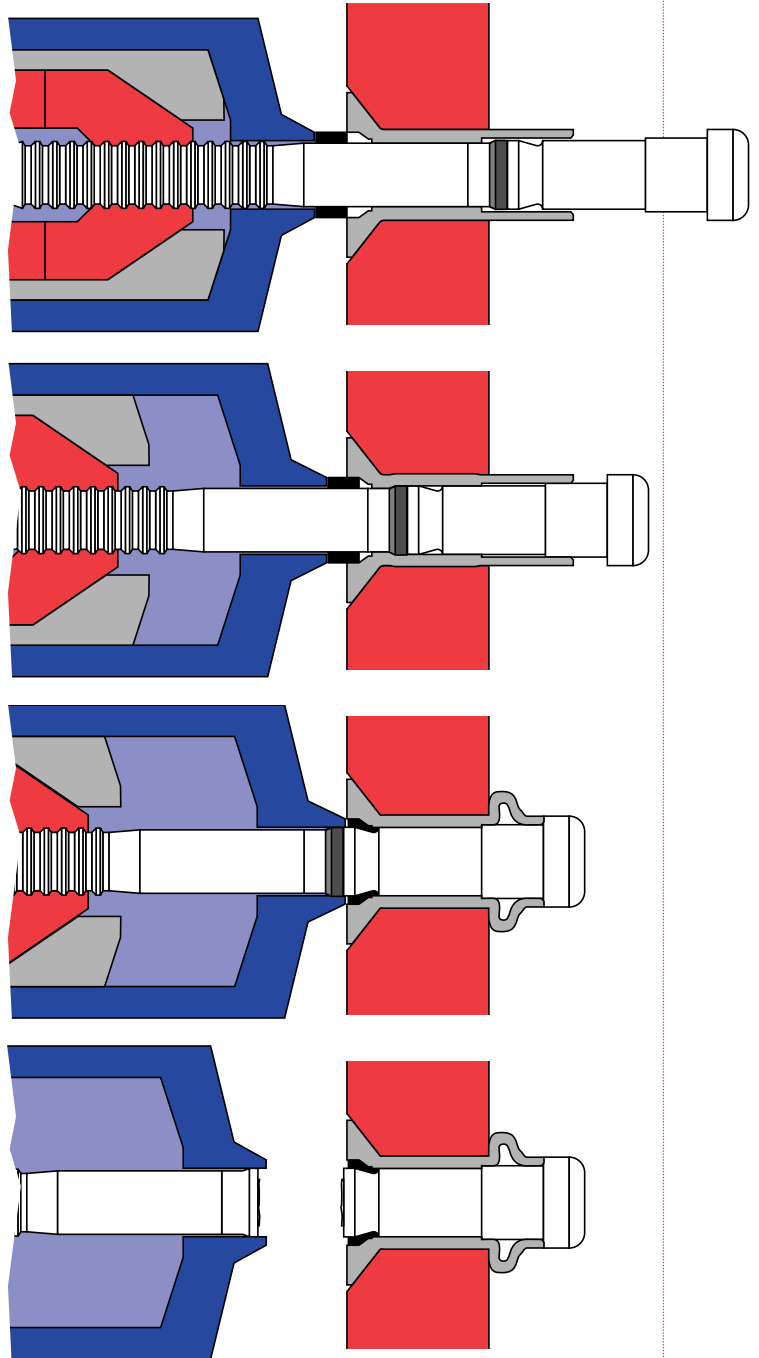
The spindle moves through the rivet sleeve forcing hole fill by means of an interference fit lobe on the spindle. Eventually the spindle head contacts the end of the sleeve and blind side bulb formation begins.

### Step Three

Continued motion of the spindle starts pulling the sheets together and forming the blind side bulb. As the lock groove of the spindle aligns itself with the lock pocket of the sleeve, the lock collar is swaged into the lock cavity.

### Step Four

As the pulling load continues to increase, the spindle separates in the break neck. The spindle break is flush with the rivet head, the lock is firmly in place and the installation is complete. The entire installation cycle is accomplished in less than 2 seconds.



The Installation schematic shown below applies to the UNIMATIC (single action) rivets with optional drive washer. Diameters -4, -5 & -6 are installed with one and the same nose assembly.

**Step One**

The rivet is placed into the prepared hole with clearance. The installation tool engages the pintail and the cycle begins. The pulling load is reacted against the lock collar through the drive washer.

**Step Two**

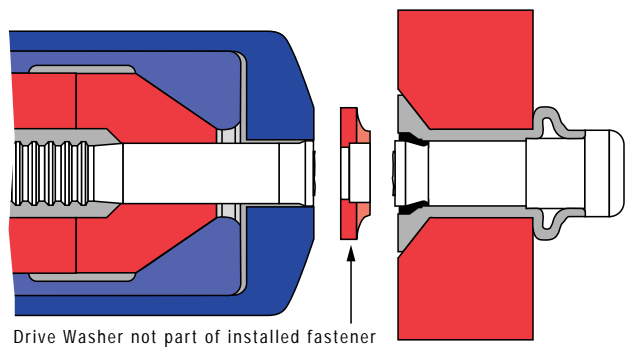
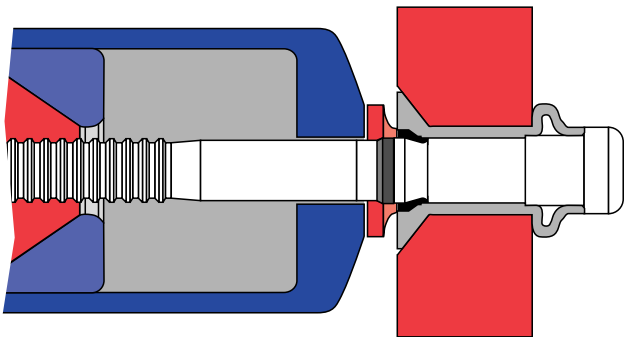
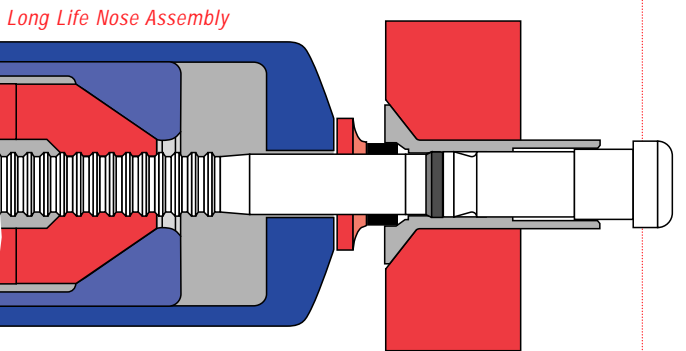
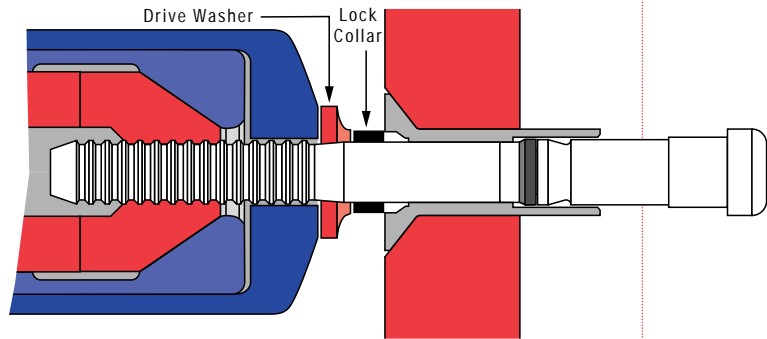
The spindle moves through the rivet sleeve forcing hole fill by means of an interference fit lobe on the spindle. Eventually the spindle head contacts the end of the sleeve and blind side bulb formation begins.

**Step Three**

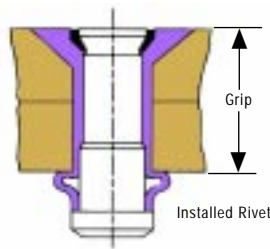
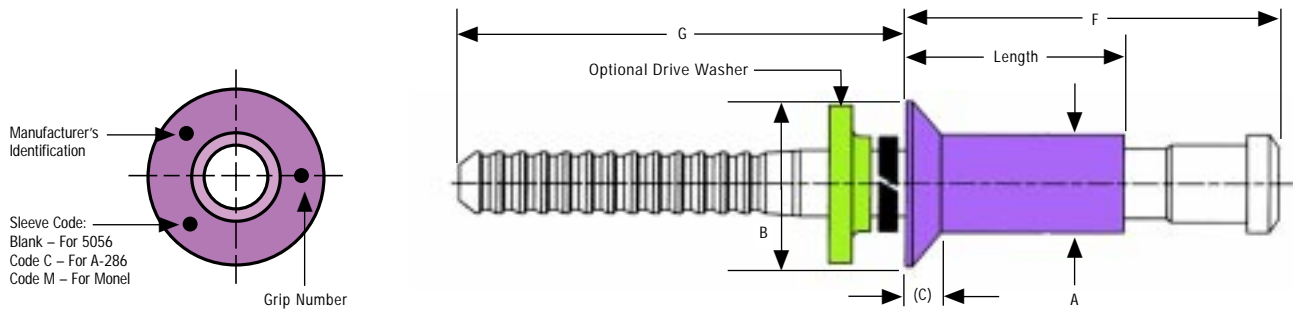
Continued motion of the spindle starts pulling the sheets together and forming the blind side bulb. As the lock groove of the spindle aligns itself with the lock pocket of the sleeve, the lock collar is swaged into the lock cavity.

**Step Four**

As the pulling load continues to increase, the spindle separates at the break neck. The spindle break is flush with the rivet 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. Concerns about tool wear are eliminated.



# 100° Flush Head SMLS100/NAS1921



Part Number	Size	Rivet Nominal Diameter	A Dia. +.003 -.001	B Dia. ±.004	(C) Ref. Head Height	G Min. Dimension
SMLS100-(*)04-(**) NAS1921(*)04S(**)	1/8 -04	.125	.125	.225	.042	.788
SMLS100-(*)05-(**) NAS1921(*)05S(**)	5/32 -05	.156	.156	.286	.055	.788
SMLS100-(*)06-(**) NAS1921(*)06S(**)	3/16 -06	.190	.187	.353	.070	.788
SMLS100-(*)08-(**) NAS1921(*)08S(**)	1/4 -08	.250	.250	.476	.095	1.000

(\*) Indicates material code letter. (\*\*) Indicates grip length number.

## Rivet Length Chart

Grip No.	Rivet Grip Range		SMLS100-(*)04 NAS 1921(*)04		SMLS100-(*)05 NAS 1921(*)05		SMLS100-(*)06 NAS 1921(*)06		SMLS100-(*)08 NAS 1921(*)08	
	Min.	Max.	Length Max.	F Max.	Length Max.	F Max.	Length Max.	F Max.	Length Max.	F Max.
01	See Note A	See Note A	.213	.342	.238	.418				
02	See Note A	.125	.260	.431	.263	.446				
03	.126	.187	.323	.516	.336	.541	.287	.500	.427	.637
04	.188	.250	.385	.641	.398	.666	.412	.696	.460	.762
05	.251	.312	.448	.766	.461	.791	.475	.821	.522	.887
06	.313	.375	.510	.891	.523	.916	.537	.946	.585	1.012
07	.376	.437	.573	1.016	.586	1.041	.600	1.071	.647	1.137
08	.438	.500	.635	1.141	.648	1.166	.662	1.196	.710	1.262
09	.501	.562	.698	1.266	.711	1.291	.725	1.321	.772	1.387
10	.563	.625	.760	1.391	.773	1.416	.787	1.446	.835	1.512
11	.626	.687			.836	1.541	.850	1.571	.897	1.637
12	.688	.750					.912	1.696	.960	1.762
13	.751	.812							1.022	1.887
14	.813	.875							1.085	2.012

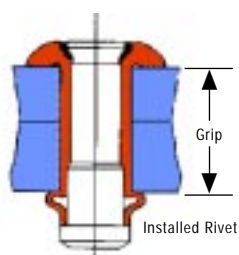
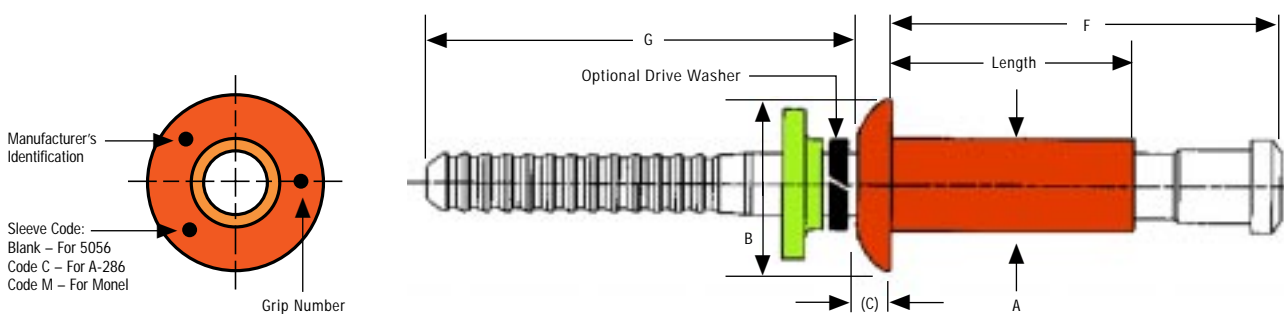
**NOTE A**

Grips	Diameters		
	-04	-05	-06
-01	.057/.078	.075/.100	-
-02	.079/.125	.100/.125	.100/.125

## Materials and Finish

Rivet Components	"B" Material Code Aluminum Blind Rivets	"C" or "EU" Material Code A286 CRES Blind Rivets	"M" Material Code MONEL Blind Rivets
Component Material			
Sleeve	5056 Aluminum	A286 Cres	MONEL Per QQ-N-281
Spindle	2024 Aluminum	A286 Cres	A286 Cres
Lock collar	5056 Aluminum	A286 Cres	A286 Cres
Component Finish or Surface Treatment			
Sleeve	None	Passivated	None
Spindle	Chem. Treatment Per MIL-C-5541	Passivated	Passivated
Lock collar	None	Passivated	Passivated

For other finish options refer to, "How to Order UNIMATIC Blind Rivets" Page 18



Part Number	Size	Rivet Nominal Diameter	A Dia. +.003 -.001	B Dia.	(C) Ref. Head Height	G Min. Dimension
SMLSP-(*)04-(**) NAS1919 (*)04S(**)	1/8 -04	.125	.125	.250 ±.012	.054	.788
SMLSP-(*)05-(**) NAS1919 (*)05S(**)	5/32 -05	.156	.156	.312 ±.016	.067	.788
SMLSP-(*)06-(**) NAS1919 (*)06S(**)	3/16 -06	.190	.187	.375 ±.019	.080	.788
SMLSP-(*)08-(**) NAS1919 (*)08S(**)	1/4 -08	.250	.250	.500 ±.025	.107	1.000

(\*) Indicates material code letter. (\*\*) Indicates grip length number.

**Rivet Length Chart**

Grip No.	Rivet Grip Range		SMLSP-(*)04 NAS1919(*)04		SMLSP-(*)05 NAS1919(*)05		SMLSP-(*)06 NAS1919(*)06		SMLSP-(*)08 NAS1919(*)08	
	Min.	Max.	Length Max.	F Max.	Length Max.	F Max.	Length Max.	F Max.	Length Max.	F Max.
00	See Note A	See Note A	.171	.298	.193	.356				
01	See Note A	.062	.198	.338	.227	.378	.251	.431		
02	.063	.125	.260	.443	.273	.478	.287	.526	.335	.606
03	.126	.187	.323	.568	.336	.602	.350	.651	.397	.731
04	.188	.250	.385	.693	.398	.727	.412	.776	.460	.856
05	.251	.312	.448	.818	.461	.852	.475	.901	.522	.981
06	.313	.375	.510	.943	.523	.977	.537	1.026	.585	1.106
07	.376	.437	.573	1.068	.586	1.102	.600	1.151	.647	1.231
08	.438	.500	.635	1.193	.648	1.227	.662	1.276	.710	1.356
09	.501	.562	.698	1.318	.711	1.352	.725	1.401	.772	1.481
10	.563	.625	.760	1.443	.773	1.477	.787	1.526	.835	1.606
11	.626	.687			.836	1.602	.850	1.651	.897	1.731
12	.688	.750					.912	1.776	.960	1.856
13	.751	.812							1.022	1.981
14	.813	.875							1.085	2.106

**NOTE A**

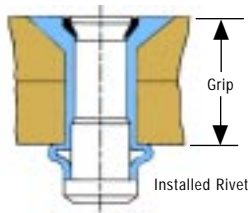
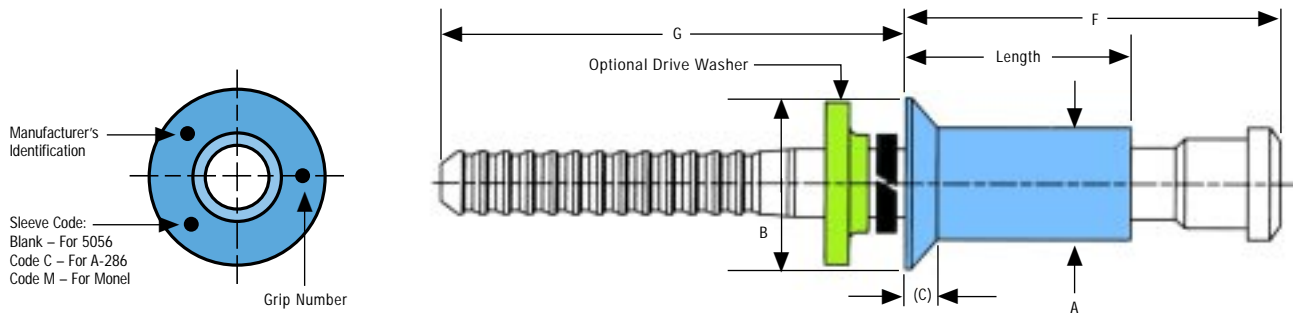
Grips	Diameters		
	-04	-05	-06
-00	.020/.035	.025/.045	-
-01	.025/.062	.031/.062	.037/.062

**Materials and Finish**

Rivet Components	"B" Material Code Aluminum Blind Rivets	"C" or "EU" Material Code A286 CRES Blind Rivets	"M" Material Code MONEL Blind Rivets
Component Material			
Sleeve	5056 Aluminum	A286 Cres	MONEL Per QQ-N-281
Spindle	2024 Aluminum	A286 Cres	A286 Cres
Lock ring	5056 Aluminum	A286 Cres	A286 Cres
Component Finish or Surface Treatment			
Sleeve	None	Passivated	None
Spindle	Chem. Treatment Per MIL-C-5541	Passivated	Passivated
Lock ring	None	Passivated	Passivated

For other finish options refer to, "How to Order UNIMATIC Blind Rivets" Page 18

# 100° Flush Head OSMLS100 Oversize Blind Rivet



Part Number	Size	Rivet Nominal Diameter	A Dia. +.003/-.001	B Dia. ±.004	(C) Ref. Head Height	G Min. Dimension
OSMLS100-(*)04-(**)	1/8 (04)	.140	.140	.225	.035	.788
OSMLS100-(*)05-(**)	5/32 (05)	.173	.173	.286	.048	.788
OSMLS100-(*)06-(**)	3/16 (06)	.201	.201	.353	.063	.788
OSMLS100-(*)08-(**)	1/4 (08)	.266	.266	.476	.088	1.000

(\*) Indicates material code letter . (\*\*) Indicates grip length number.

## Rivet Length Chart

Grip No.	Rivet Grip Range		OSMLS100-(*)04		OSMLS100-(*)05		OSMLS100-(*)06		OSMLS100-(*)08	
	Min.	Max.	(Length)	F Max.	(Length)	F Max.	(Length)	F Max.	(Length)	F Max.
01	See Note A	See Note A	.213	.342	.238	.418				
02	See Note A	.125	.260	.391	.263	.446	.287	.500		
03	.126	.187	.323	.516	.336	.541	.350	.571	.427	.637
04	.188	.250	.385	.641	.398	.666	.412	.696	.450	.762
05	.251	.312	.448	.755	.461	.791	.475	.821	.522	.887
06	.313	.375	.510	.891	.523	.916	.537	.946	.585	1.012
07	.376	.437	.573	1.016	.586	1.041	.600	1.071	.647	1.137
08	.438	.500	.635	1.141	.648	1.166	.662	1.196	.710	1.262
09	.501	.562	.698	1.266	.711	1.291	.725	1.321	.772	1.387
10	.563	.625	.760	1.391	.773	1.416	.787	1.446	.835	1.512
11	.626	.687			.836	1.541	.850	1.571	.897	1.637
12	.688	.750					.912	1.696	.960	1.762
13	.751	.812							1.022	1.887
14	.813	.875							1.085	2.012

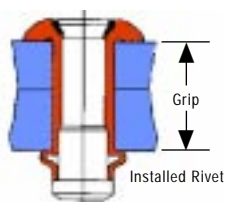
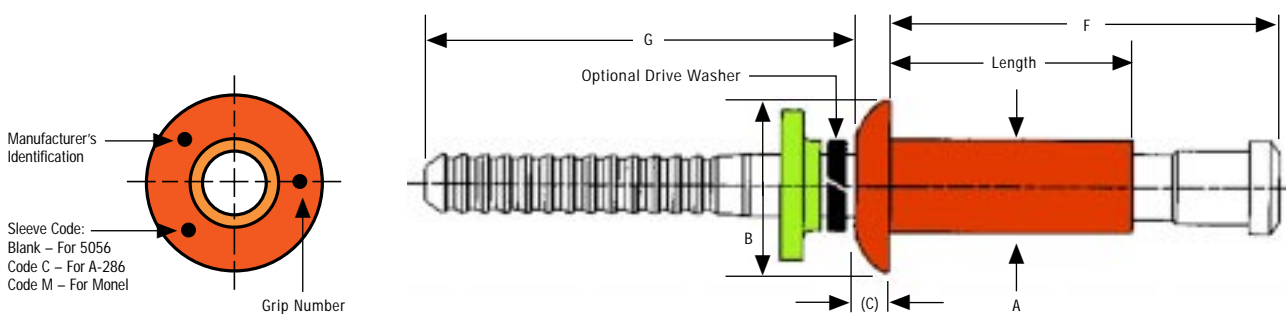
### NOTE A

Grips	Diameters		
	-04	-05	-06
	-01	.057/.078	.075/.100
-02	.079/.125	.100/.125	.100/.125

## Materials and Finish

Rivet Components	"B" Material Code Aluminum Blind Rivets	"C" or "EU" Material Code A286 CRES Blind Rivets	"M" Material Code MONEL Blind Rivets
Component Material			
Sleeve	5056 Aluminum	A286 Cres	MONEL Per QQ-N-281
Spindle	2024 Aluminum	A286 Cres	A286 Cres
Lock collar	5056 Aluminum	A286 Cres	A286 Cres
Component Finish or Surface Treatment			
Sleeve	None	Passivated	None
Spindle	Chem. Treatment Per MIL-C-5541	Passivated	Passivated
Lock collar	None	Passivated	Passivated

For other finish options refer to, "How to Order UNIMATIC Blind Rivets" Page 18



Part Number	Size	Rivet Nominal Diameter	A Dia. +.003 -.001	B Dia.	(C) Ref. Head Height	G Min. Dimension
OSMLSP-(*)04-(**)	1/8 (04)	.140	.140	.250 ±.012	.054	.788
OSMLSP-(*)05-(**)	5/32 (05)	.173	.173	.312 ±.016	.067	.788
OSMLSP-(*)06-(**)	3/16 (06)	.201	.201	.375 ±.019	.080	.788
OSMLSP-(*)08-(**)	1/4 (08)	.266	.266	.500 ±.025	.107	1.000

(\*) Indicates material code letter. (\*\*) Indicates grip length number.

### Rivet Length Chart

Grip No.	Grip Range		OSMLSP-(*)04		OSMLSP-(*)05		OSMLSP-(*)06		OSMLSP-(*)08	
	Min.	Max.	Length	F Max.	Length	F Max.	Length	F Max.	Length	F Max.
01	( 1 )	.062	.198	.338	.227	.378	.251	.431		
02	.063	.125	.260	.443	.273	.478	.287	.526	.335	.606
03	.126	.187	.323	.568	.336	.602	.350	.651	.397	.731
04	.188	.250	.385	.693	.398	.727	.412	.776	.460	.856
05	.251	.312	.448	.818	.461	.852	.475	.901	.522	.981
06	.313	.375	.510	.943	.523	.977	.537	1.026	.585	1.106
07	.376	.437	.573	1.068	.586	1.102	.600	1.151	.647	1.231
08	.438	.500	.635	1.193	.648	1.227	.662	1.276	.710	1.356
09	.501	.562	.698	1.318	.711	1.352	.725	1.401	.772	1.481
10	.563	.625	.760	1.443	.773	1.477	.787	1.526	.835	1.606
11	.626	.687			.836	1.602	.850	1.651	.897	1.731
12	.688	.750					.912	1.776	.960	1.856
13	.751	.812							1.022	1.981
14	.813	.875							1.085	2.106

( 1 ) Minimum grip for .04 diameter is .025". For .05 diameter is .031". For .06 diameter is .037".

### Materials and Finish

Rivet Components	"B" Material Code Aluminum Blind Rivets	"C" or "EU" Material Code A286 CRES Blind Rivets	"M" Material Code MONEL Blind Rivets
Component Material			
Sleeve	5056 Aluminum	A286 Cres	MONEL
Spindle	2024 Aluminum	A286 Cres	A286 Cres
Lock collar	5056 Aluminum	A286 Cres	A286 Cres
Component Finish or Surface Treatment			
Sleeve	None	Passivated	None
Spindle	Chem. Treatment Per MIL-C-5541	Passivated	Passivated
Lock collar	None	Passivated	Passivated

For other finish options refer to, "How to Order UNIMATIC Blind Rivets" Page 18

## Fastener Selection and Identification

### Head Markings

#### Rivet heads carry the following Identification marks:

The special "H" as manufacturer's identification symbol.

A material code letter.

Aluminum rivets = no letter.

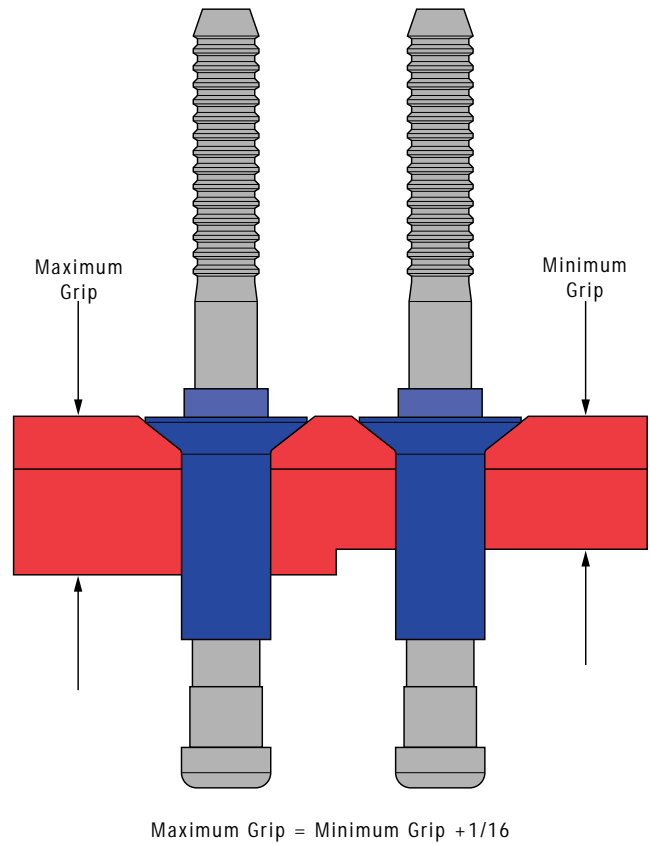
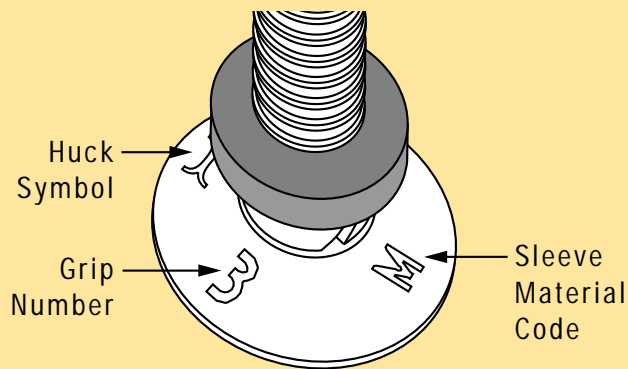
Monel rivets = letter "M".

A-286 rivets = letter "C".

A grip identification number.

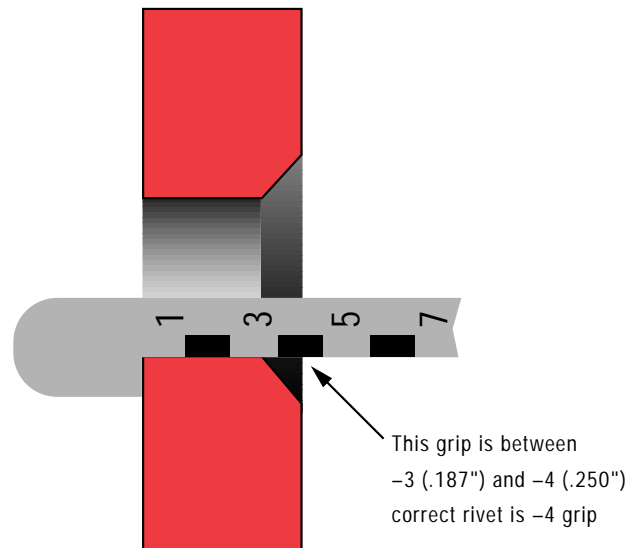
Grip range = nominal grip  $\pm 0.063$ "

Example: -4 grip ranges from .250" to .188".



### Grip Gauging

Correct gauging of grip thickness will help to insure sound rivet installations. Huck offers grip measurement gages, which help assure proper fastener grip selection. Huck Gage #105093 (Red letters only) is configured to gage structural thickness for Blind Rivet grip selection. Care should be taken, that possible sheet gap does not affect grip measurement and does not result in selection of a rivet too long for the job.



Minimum Ultimate Tensile (Pounds)			
Nominal Rivet Diameter	Code B Aluminum Alloy	Code M Monel	Code C A286 CRES
1/8 (04)	325	675	675
5/32 (05)	490	1050	1050
3/16 (06)	715	1500	1500
1/4 (08)	1200	2600	2600

Minimum Single Shear Strength (Pounds)			
Nominal Rivet Diameter	Code B Aluminum Alloy	Code M MONEL	Code C A286 CRES
1/8 (04)	495	1020	1090
5/32 (05)	755	1565	1670
3/16 (06)	1090	2260	2400
1/4 (08)	1970	4000	4250

Minimum Spindle Retention (Pounds)			
Nominal Rivet Diameter	Code B Aluminum Alloy	Code M MONEL	Code C A286 CRES
1/8 (04)	125	200	200
5/32 (05)	200	320	320
3/16 (06)	290	465	465
1/4 (08)	510	815	815

**Hole Fill Capability**

Hole filling is accomplished in the “heart of the line” sizes (i.e. in structure thickness up to 2 rivet diameters) by mechanical expansion. An expansion lobe on the rivet spindle forces sleeve expansion and thereby hole fill during the installation process.

**Sheet Take-up Capability**

The rivet system has gap closing capability as detailed in the table below.

		Force Resisting Gap Closure		
Nominal Diameter	Gap	Alum Code “B”	Monel Code “M”	A-286 Code “C”
1/8 (04)	.010	10	15	15
5/32 (05)	.015	15	22	22
3/16 (06)	.020	20	30	30
1/4 (08)	.025	30	45	45

**Thin Sheet Capability**

The Huck Unimatic system has unique thin sheet tolerance. This is due to the fact that the sleeve component absorbs the majority of the bulb forming forces and there is little tendency for the fastener to over expand and “buckle” thin sheets, particularly at the blind side end. The blind side sheet as thin as .020” can be joined without structural distortion.

## Static Joint Strength [MIL-HDBK-5 Data]

### Static joint strength of nominal diameter flush head. MLS100 / NAS1921 Blind Rivets tested in Clad 7075-T6 Aluminum Sheet.

#### Ultimate Strength

Fastener Type	SMLS100-B/NAS1921B			SMLS100-M/NAS1921M			SMLS100-EU/NAS1921C		
Fastener Material	Aluminum Alloy Rivets			MONEL Rivets			A286 Rivets		
Fastener Dia.	1/8	5/32	3/16	1/8	5/32	3/16	1/8	5/32	3/16
Sheet Thickness	(.130)	(.162)	(.194)	(.130)	(.162)	(.194)	(.130)	(.162)	(.194)
.040	171								
.050	232	267		595 a			612 a		
.063	313	366	411	732 a	927 a		749 a	956 a	
.071	360	427	484	816 a	1035 a		831 a	1060 a	
.080	416	498	566	913 a	1158 a	1400 a	923 a	1180 a	1450 a
.090	477	571	658	946 a	1289 a	1570 a	1110 a	1305 a	1605 a
.100	494	647	748	980 a	1415 a	1720 a	1090 a	1435 a	1755 a
.125		755	978	1020	1525 a	2055 a		1670 a	2130 a
.160			1090		1565 a	2245 a			2400 a
.190						2260			
Rivet Shear Strength	495	755	1090	1020	1565	2260	1090	1670	2400

#### Yield Strength

.040	110								
.050	161	171		354			365		
.063	247	254	270	447	554		466	571	
.071	303	315	330	504	625		528	649	
.080	354	395	399	569	707	843	598	737	873
.090	373	484	506	607	796	952	639	835	990
.100	393	549	611	626	885	1060	686	931	1105
.125		610	803	686	972	1265	804	1065	1325
.160			906		1080	1430			1605
.190						1540			
Head Height (Ref.)	.042	.055	.070	.042	.055	.070	.042	.055	.070

#### Notes:

Data for Aluminum alloy blind rivets taken from MIL-HDBK-5G Chapter 8, page 8-67.

Data for Monel blind rivets taken from MIL-HDBK-5G Chapter 8, page 8-65.

Data for A286 CRES blind rivets taken from MIL-HDBK-5G Chapter 8, page 8-63.

Data above double line is knife edge condition.

Values identified with the letter (a) have a yield strength less than 2/3 of the indicated ultimate value.

Yield values are based on permanent set at 4% of nominal diameter.

#### Comment:

No comprehensive joint data is published for protruding head rivets. The rationale is that flush head allowables can be used for reference. Actually, joint capabilities for protruding head rivets are significantly higher at the thin end of the structure profile, up to perhaps .070" or .080" sheet thickness.

The installed weights listed in the tables below are approximate and based on actual weight of one or more production lots, averaged and rounded to the nearest 1/100 of a pound per thousand pieces.

Protruding Head, Unimatic Blind Rivets (weight in lbs./1000)

Grip Length	NAS1919B – ALUMINUM				NAS1919M – MONEL				NAS1919C – A-286 CRES			
	1/8" (04) Dia	5/32" (05) Dia	3/16" (06) Dia	1/4" (08) Dia	1/8" (04) Dia	5/32" (05) Dia	3/16" (06) Dia	1/4" (08) Dia	1/8" (04) Dia	5/32" (05) Dia	3/16" (06) Dia	1/4" (08) Dia
00	0.38	0.59			1.10	2.27			1.12	2.02		
01	0.45	0.72	1.27		1.30	2.43	4.29		1.29	2.36	3.83	
02	0.52	0.85	1.44	3.79	1.55	2.82	4.84	10.30	1.53	2.73	4.36	9.29
03	0.59	0.98	1.62	4.07	1.80	3.21	5.38	11.34	1.77	3.10	4.83	10.17
04	0.66	1.11	1.80	4.34	2.05	3.60	5.93	12.39	2.01	3.47	5.33	11.11
05	0.73	1.24	1.98	4.63	2.30	3.99	6.48	13.43	2.25	3.84	5.83	12.01
06	0.80	1.37	2.16	4.91	2.55	4.38	7.03	14.47	2.49	4.21	6.33	12.92
07	0.87	1.50	2.34	5.19	2.80	4.77	7.58	15.52	2.73	4.58	6.82	13.82
08	0.94	1.63	2.52	5.47	3.05	5.16	8.12	16.56	2.97	4.95	7.32	14.73
09		1.76	2.70	5.75		5.55	8.67	17.61		5.32	7.82	15.64
10		1.89	2.88	6.03		5.94	9.22	18.65		5.69	8.32	16.55
11		2.02	3.06	6.31		6.33	9.77	19.69		6.06	8.81	17.46
12		2.15	3.24	6.59		6.72	10.32	20.74		6.43	9.31	18.36
13			3.42	6.87			10.86	21.78			9.81	19.27
14			3.60	7.15			11.41	22.83			10.30	20.18
15			3.78	7.43			11.96	23.87			10.80	21.09

Flush Head, Unimatic Blind Rivets (weight in lbs./1000)

Grip Length	NAS1921B – ALUMINUM				NAS1921M – MONEL				NAS1921C – A-286 CRES			
	1/8" (04) Dia	5/32" (05) Dia	3/16" (06) Dia	1/4" (08) Dia	1/8" (04) Dia	5/32" (05) Dia	3/16" (06) Dia	1/4" (08) Dia	1/8" (04) Dia	5/32" (05) Dia	3/16" (06) Dia	1/4" (08) Dia
01	0.30	0.49			0.84	1.43			0.79	1.46		
02	0.35	0.59	0.98		1.09	1.82	2.95		1.03	1.93	2.85	
03	0.42	0.72	1.16	2.59	1.34	2.21	3.50	8.04	1.27	2.20	3.37	7.21
04	0.49	0.85	1.34	2.87	1.59	2.59	4.05	9.09	1.52	2.60	3.90	8.15
05	0.56	0.98	1.52	3.15	1.84	2.98	4.59	10.13	1.76	2.97	4.42	9.08
06	0.63	1.11	1.70	3.43	2.09	3.37	5.14	11.18	2.00	3.34	4.94	10.02
07	0.70	1.24	1.88	3.71	2.34	3.76	5.69	12.22	2.24	3.71	5.46	10.96
08	0.77	1.37	2.06	3.99	2.59	4.15	6.24	13.26	2.48	4.08	5.98	11.90
09		1.50	2.24	4.27		4.53	6.79	14.31		4.45	6.51	12.84
10		1.63	2.42	4.55		4.92	7.33	15.35		4.82	7.03	13.77
11		1.76	2.60	4.83		5.31	7.88	16.40		5.19	7.55	14.71
12		1.89	2.78	5.11		5.70	8.43	17.44		5.56	8.07	15.65
13			2.96	5.39			8.98	18.48			8.59	16.59
14			3.14	5.67			9.53	19.53			9.12	17.53
15			3.32	5.95			10.07	20.57			9.64	18.46

## Recommendations For Hole Preparation And Installation

### Hole Preparation

Drill sizes should be chosen to generate holes within the diameters recommended in the table below. If holes are drilled at the low limit, or if sealant is used in assembly, spindles sometimes break low and installations are not complete. 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 hole.

#### Hole Preparation

Rivet Diameter	Nominal Dia. Rivets		Oversize Dia. Rivets		Countersink Diameter
	Recommended Hole Limits	Recommended Drill Size	Recommended Hole Limits	Recommended Drill Size	Recommended C'sink Diameter (Note)
-4	.129/.132	#30; 3.3mm	.143/.146	#27; 3.7mm	.222/.228
-5	.160/.164	#20; 4.1mm	.176/.180	#16; 4.5mm	.283/.289
-6	.192/.196	#10; 4.9mm	.205/.209	#5; 5.25mm	.350/.356
-8	.256/.261	"F"	na	na	.472/.480

#### A few 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. In the case of Aluminum structure, drill speeds of 4,000 to 6,000 RPM are recommended.
- Excessive "push" on the drill motor can create sheet separation and burrs.
- Hole normality is important. Angularity beyond 2° 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 gun should be properly aligned and firmly pushed against the structure. This helps to avoid minor sheet gapping due to misalignment and 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 (1) the nose anvil (worn anvils can cause poor seating of lock collars) and (2) the gripping jaws (worn and dirty jaws can cause slipping of the jaws and breaking in the pin tails).
- The pintails are ejected through the gun. Pintail collector bags are available for all popular gun models and help to reduce debris in the work place.

The position of the spindle break and the lock collar provide important information about the quality of the installation. The table below shows the limits published in the NAS1900 procurement specification. Spindle and collar flushness per this table indicate good installations, which meet mechanical performance requirements of NAS1900.

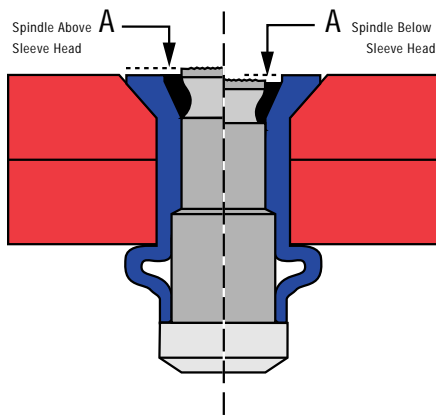
### Stem Protrusion Limits

Rivet Diameter	"A" Dimension For Flush Monel & A-286 Rivets	"A" Dimension For All Other Rivets	Lock Collar Position
-04	+ .010/- .005	+ .018/- .008	Flush or Below Spindle Fracture Surface
-05	+ .010/- .005	+ .022/- .010	
-06	+ .010/- .005	+ .025/- .012	
-08	+ .015/- .005	+ .032/- .016	

### Spindle and Head Shaving Option

Spindle shaving or head shaving (spindle, sleeve and lock collar) for more perfect aerodynamic or cosmetic reasons is possible providing the following guidelines are observed:

- Spindle and collar flushness prior to shaving meets the limits of the above table.
- Shaving is performed with care to assure that the cutter does not snag the lock collar and impair the lock.
- Head shaving does not exceed .005" to .010". Shaving beyond these limits could reduce the reliability of the lock.



#### Lock Collar Installation Requirements

The driven lock collar must be flush or below the spindle land as indicated below, providing the spindle position meets the limits of "A" dimension shown above.

Inspection for proper installation of UNIMATIC blind rivets is made from the visible side. If the stem position is within limits shown, the fastener will meet mechanical performance requirements.

### Trouble Shooting Suggestions

Problem	Possible Cause	Remedy
Spindle breaks high	Oversize hole	1. Check hole diameter and drilling technique. 2. Remove & replace with oversize rivet.
	Rivet grip too long	Remove and replace with proper grip rivet.
	Installation tool	Defective or wrong tool/nose piece.
	Defective rivet	Inspect rivets and test function in a test hole.
Spindle breaks low	Undersize hole	Remove rivet, ream hole to size and install a new rivet. Note: When working with wet sealant, allow for a little extra hole clearance to provide space for the sealant.
	Rivet grip too short	Remove and replace with proper grip rivet.
	Misaligned hole	Review hole preparation and assembly technique.
	Tool cocked	Align installation tool with axis of rivet.
	Installation tool	Defective or wrong tool/nose piece.
	Defective rivet	Inspect rivets and test function in a test hole.
Gripping jaws slipping	Build-up of debris in jaws	Disassemble and clean jaws; replace jaws if worn.
Lock ring not seated	Tool worn	Replace anvil in tool nose.
Head not seated	Hole cocked	Hole should be normal to surface within 2°.
	Tool cocked	Align installation tool with axis of rivet.
	Eccentric countersink	Good fit between hole and c'sink pilot.
	Undersize hole	Hole too small or trapped sealant can cause "head rise".
Bulb off sheet	Selected too long a grip for the job	Remove and replace with proper size rivet.

# Installation Tool Systems

The nose attachments below apply to traditional NAS1919/1921 rivets without integral Drive Washers!

## Installation Tooling

### Models 202 and 2012 Guns

Rivet Dia.	Short	Standard	Long
-04	99-2724	99-2725	99-2726
-05	99-2730	99-2731	99-2732
-06	99-2736	99-2737	99-2738

### Model 230 Gun

Rivet Dia.	Short	Standard	Long
-04	99-2724	99-2725	99-2726
-05	99-2730	99-2731	99-2732
-06	99-2736	99-2737	99-2738
-08	99-2742	99-2743	99-2744

### Models 245 and 246 Guns

Rivet Dia.	Short	Standard	Long
-08	99-2745	99-2746	99-2747

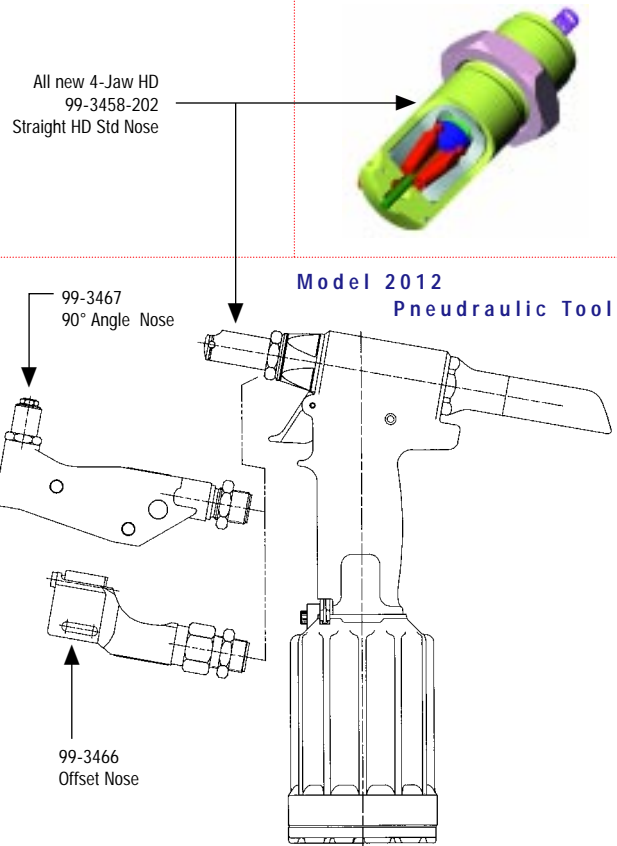
Hand Tool "HK-150-456" may be used for small volume field repair work for installation of -4, -5 & -6 diameter rivets. This tool comes equipped with individual diameter inserts.

## Offset Tooling

### Hydraulic Power Tool Model 206-375

Rivet Dia.	1 1/4" Offset	1 7/8" Offset
-04	99-1715	99-1715-1
-05	99-1716	99-1716-1
-06	99-1717	99-1717-1

The nose attachments below apply to NAS1919/1921U rivets with integral Drive Washers ONLY!



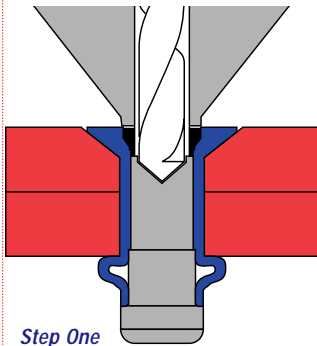
**Huck Model 2012** is an all new installation tool, formulated for NAS 1919/1921 blind rivets, with specific emphasis on ergonomic shape, light weight and durability. One tool and one nose can install sizes -4, -5 & -6 diameter "U" code rivets. The following nose attachments are designed to fit directly on this new tool:

Straight HD Std	99-3458-202	Heavy Duty
Straight HD Long	99-3459-202	Heavy Duty
Offset 2 Jaw	99-3466	Std Duty
90° Angle Nose	99-3467	Std Duty

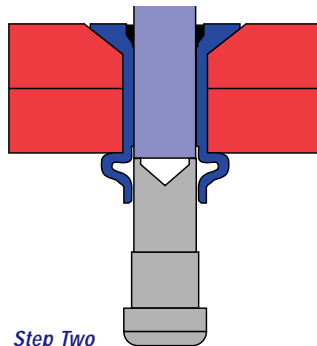
**Important note:** In the interest of long tool life, Offset and 90° Angle tools should only be used when access limitation require them. Durability of straight tools is a multiple of that of limited access tools.

**UNIMATIC Blind Rivets can easily be removed without damage to the structure if the following procedure is followed and if the removal kits are used.**

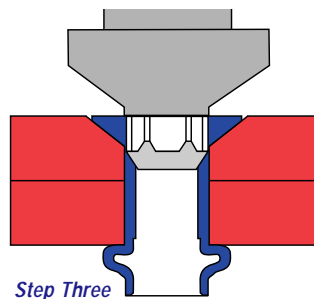
Fastener Diameter	Removal tool kit part number	Removal kit, drill and punch sizes			
		Fastener Diameter	Pin-drill Diameter Depth	Pin Punch Diameter	Sleeve Punch Diameter
1/8 (04)	105-24	1/8 (04)	.081 Dia., .040 Deep	1/16	1/8
5/32 (05)	105-25	5/32 (05)	.1015 Dia., .050 Deep	3/32	5/32
3/16 (06)	105-26	3/16 (06)	.120 Dia., .060 Deep	3/32	3/16
1/4 (08)	105-28	1/4 (08)	.159 Dia., .070 Deep	1/8	1/4



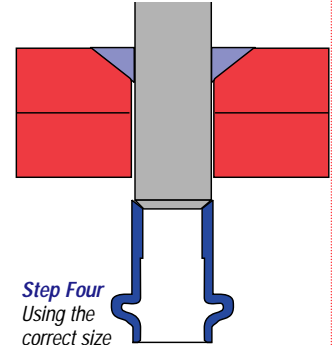
**Step One**  
Place drill bushing from removal kit so that it rests squarely on lock collar. Using a drill from the proper removal kit drill at a 1250 RPM maximum to lock collar depth.



**Step Two**  
Position pin punch from proper removal kit in drilled area and drive out remaining pin. Remove any lock ring remaining in the sleeve head with the pin punch.



**Step Three**  
Using adjustable micro limit tool in removal kit adjust cutter to depth of fastener head. Micro-limit tool is fitted with a anti-rotation cap to hold sleeve head during cutting operation.

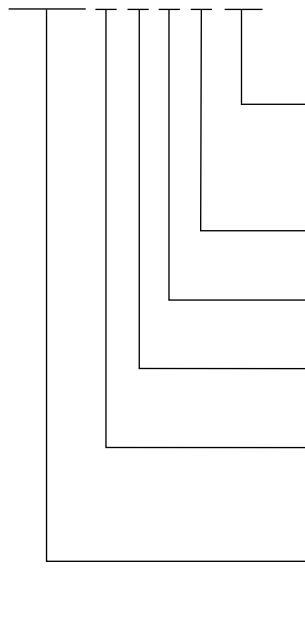


**Step Four**  
Using the correct size sleeve punch from the kit push out the remaining sleeve. Use the same punch to lift out the remaining head piece.

**How To Order Unimatic Blind Rivets**

**NAS Part Numbers**

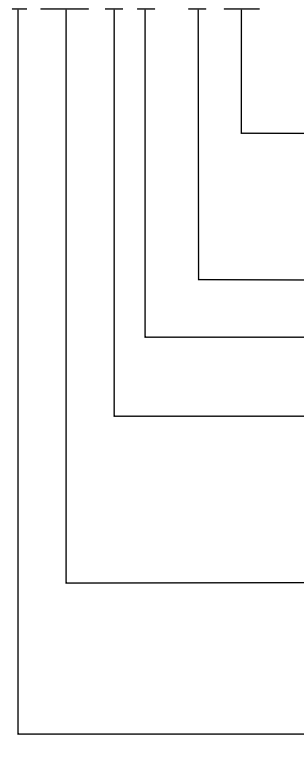
NAS1919 B 04 S 04 FCU



- Coating codes**  
No code indicates uncoated  
**A** – Indicates Aluminum Coating per NAS4006  
**FC** – Indicates Chemical Film per MIL-C-5541  
**W** – Indicates Cadmium Plating per QQ-P-416  
**U** – Optional Drive Washer
- Fastener Grip Length**  
Shown in 1/16 (.062") inch increments
- Installation Method**  
**S** – Indicates Single Action Installation  
– Indicates double action installation
- Fastener Diameter**  
Shown in 1/32 (.031") inch increments
- Material Code**  
**B** – Indicates 5056 Aluminum  
**C** – Indicates A-286 CRES  
**M** – Indicates MONEL
- Basic Part Number**  
**NAS 1919** – Indicates Protruding Head Blind Rivet  
**NAS 1921** – Indicates Flush Head Blind Rivet

**Huck Part Numbers**

S MLSP B-04 - 04 FCU



- Coating codes**  
No code indicates uncoated  
**A** – Indicates Aluminum Coating per NAS4006  
**FC** – Indicates Chemical Film per MIL-C-5541  
**C** – Indicates Cadmium Plating per QQ-P-416  
**EL** – Indicates Dry Film Lube (Dicronite DL-5)  
**U** – Optional Drive Washer
- Fastener Grip Length**  
Shown in 1/16 (.062") inch increments
- Fastener Diameter**  
Shown in 1/32 (.031") inch increments
- Material Code**  
**B** – Indicates 5056 Aluminum  
**EU** – Indicates A-286 CRES  
**M** – Indicates MONEL
- Basic Part Number**  
**MLSP** – Indicates Protruding Head Blind Rivet  
**MLS100** – Indicates Flush Head Blind Rivet  
**OSMLSP** – Indicates Oversize Protruding Head  
**OSMLS100** – Indicates Oversize Flush Head
- Installation Method**  
**S** – Indicates Single Action Installation  
**NO CODE** – Double Action Installation

For more information, visit our web site at [www.huckaerospace.com](http://www.huckaerospace.com). There you'll find all the technical information you need to maximize the benefits of Huck fasteners.

**For a list of authorized distributors, please contact Huck International in Tucson, Arizona at 800 234 4825**



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