

# Supplier Quick Reference

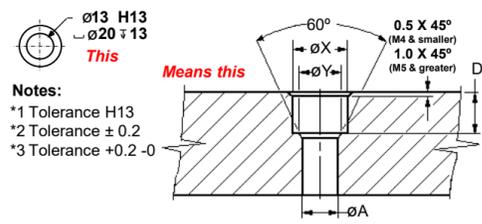
## Common Drawing Features and Manufacturing Practices

All dimensions in millimeters unless otherwise specified

### 1) Scope and Purpose

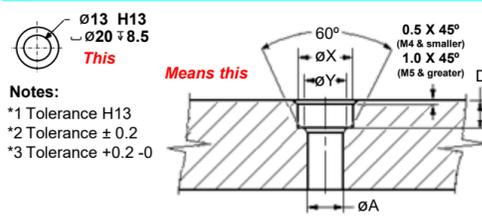
This document is a quick reference for Husky Suppliers. It is designed to complement drawings that do not fully describe specific component features. This document is not intended to replace or supersede drawing specifications. Full detail of these features is obtained by combining the drawing with the quick reference information. The quick reference is applicable on drawings where designated as follows: UNDEFINED DRAWING FEATURES TO COMPLY WITH HS534 "SUPPLIER QUICK REFERENCE"

### 2) Metric Counterbore Holes



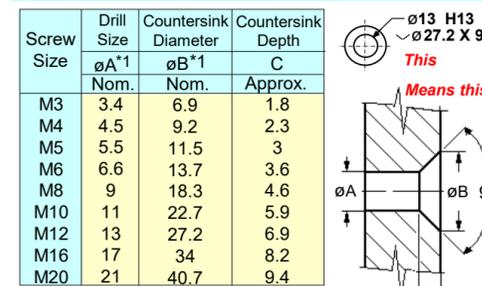
Screw Size	Drill Size	Counterbore Diameter	Countersink Diameter	Counterbore Depth
	øA <sup>*1</sup>	øX <sup>*2</sup>	øY <sup>*3</sup>	D <sup>*2</sup>
	Nom.	Nom.	Min.	Nom.
M1.6	1.8	3.5	2.0	1.8
M2	2.4	4.2	2.6	2.2
M2.5	2.9	5.0	3.1	2.7
M3	3.4	6.0	3.6	3.4
M4	4.5	8.0	4.7	4.6
M5	5.5	10.0	5.7	5.7
M6	6.6	11.0	6.8	6.8
M8	9.0	15.0	9.2	9.0
M10	11.0	18.0	11.2	11.0
M12	13.0	20.0	14.2	13.0
M16	17.0	26.0	18.2	17.5
M20	21.0	33.0	22.4	21.5
M24	25.0	38.0	26.4	25.5
M30	31.0	48.0	33.4	31.5
M36	37.0	57.0	39.4	37.5
M42	43.0	66.0	45.6	43.5
M48	49.0	75.0	52.6	50.0

### 3) Counterbore Holes for Metric LHCS



Screw Size	Drill Size	Counterbore Diameter	Countersink Diameter	Counterbore Depth
	øA <sup>*1</sup>	øX <sup>*2</sup>	øY <sup>*3</sup>	D <sup>*2</sup>
	Nom.	Nom.	Min.	Nom.
M3	3.4	6.0	3.6	2.4
M4	4.5	8.0	4.7	3.2
M5	5.5	10.0	5.7	4.0
M6	6.6	11.0	6.8	4.7
M8	9.0	15.0	9.2	6.0
M10	11.0	18.0	11.2	7.0
M12	13.0	20.0	14.2	8.5
M16	17.0	26.0	18.2	10.5
M20	21.0	33.0	22.4	13.0

### 4) Metric Countersink Holes

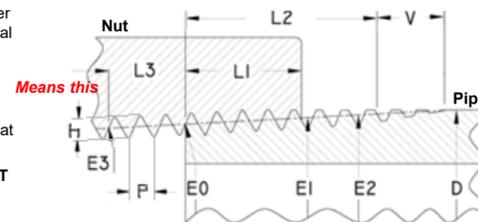


Screw Size	Drill Size	Countersink Diameter	Countersink Depth
	øA <sup>*1</sup>	øB <sup>*1</sup>	C
	Nom.	Approx.	
M3	3.4	6.9	1.8
M4	4.5	9.2	2.3
M5	5.5	11.5	3
M6	6.6	13.7	3.6
M8	9	18.3	4.6
M10	11	22.7	5.9
M12	13	27.2	6.9
M16	17	34	8.2
M20	21	40.7	9.4

Notes:  
Suitable for ISO 10642 or DIN 7991 Flat Head Cap Screws  
<sup>\*1</sup> Tolerance H13

### 8) NPT / NPTF Pipe Threads

- NPT - National Pipe Thread Taper
- NPTF - Dryseal American National Standard Taper Pipe Thread
- Sealant required on NPT
- 60° Thread Angle
- Pitch measured in inches
- Truncation of root and crest are flat
- Taper angle 1° 47' (taper 1:16)



- Notes:  
<sup>\*1</sup> Truncation from point of thread triangle to flat (not pitched on drawing). Minimum = 0.033P for all pitches. See table for maximum. For NPTF threads, refer to ANSI B1.20.3 on limits on crest and root truncation  
<sup>\*2</sup> Requires taper with reamer before tapping  
<sup>\*3</sup> Tapping drills given for taper with reamer for NPT threads 1 1/4" and greater

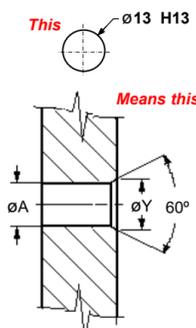
Basic dimensions given to 5 or 6 decimal places to eliminate errors when calculating gauge dimensions (do not imply a greater degree of precision)

NPT Thread (Inch)	Threads Per Inch	Outside Pipe Diameter	Pitch of Thread	Height of Thread	Truncation Max. <sup>*1</sup>	Pitch Diameter Start of Ext. Thread	Handtight Engagement		Effective Thread		Wrench Makeup Length, Internal		Vanish Thread Length	Tapping Drills <sup>*3</sup>	
							Length	Diameter	Length	Diameter	Length	Diameter		Drill Size (Inch)	Eq. (mm)
		øD	P	h	f	øE0	L1	øE1	L2	øE2	L3	øE3	V	C	Q
1/16"	27	7.9375	0.940816	0.752602	0.09144	6.887972	4.064	7.141972	6.63194	7.3025	2.82194	6.711696	3.2639	C	6.1468
1/8"	27	10.287	0.940816	0.752602	0.09144	9.233154	4.1148	9.48944	6.70306	9.652	2.82194	9.056624	3.2639	Q	8.4328
1/4"	18	13.716	1.411224	1.128776	0.12446	12.125706	5.7912	12.487402	10.20572	12.7635	4.23418	11.861038	4.89712	7/16"	11.1125
3/8"	18	17.145	1.411224	1.128776	0.12446	15.545054	6.096	15.926054	10.35812	16.1925	4.23418	15.28064	4.89712	37/64"	14.68374
1/2"	14	21.336	1.814322	1.451356	0.14224	19.264122	8.128	19.772122	13.55598	20.111466	5.44322	18.924016	6.29412	45/64"	17.85874
3/4"	14	26.67	1.814322	1.451356	0.14224	24.579072	8.6106	25.117298	13.86078	25.445466	5.44322	24.238966	6.29412	29/32"	23.02002
1"	11 1/2	33.401	2.208784	1.767078	0.16002	30.826202	10.16	31.461202	17.34312	31.91002	6.62686	30.412182	7.66318	1-9/32"	32.54502
1 1/4"	11 1/2	42.164	2.208784	1.767078	0.16002	39.551102	10.668	40.217852	17.95272	40.67302	6.62686	39.137082	7.66318	1-15/32"	37.30752
1 1/2"	11 1/2	48.26	2.208784	1.767078	0.16002	45.620686	10.2108	46.287436	18.3769	46.76902	6.62686	45.206412	7.66318	1-23/32"	43.65752
2"	11 1/2	60.325	2.208784	1.767078	0.16002	57.633108	11.0744	58.325258	19.2151	58.83402	6.62686	57.219088	7.66318	2-5/32"	54.77002
2 1/2"	8	73.025	3.175	2.54	0.19812	69.076062	17.3228	70.15861	28.8925	70.881748	6.35	68.679314	11.01598	2-25/32"	70.64502
3"	8	88.9	3.175	2.54	0.19812	84.851748	19.4564	86.0679	30.48	86.756748	6.35	84.4551	11.01598	3-9/32"	83.34502

All dimensions in millimeters unless otherwise specified

### 5) Metric Clearance Holes

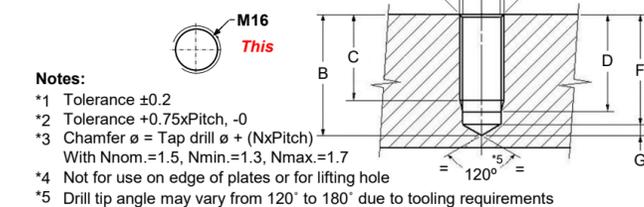
Screw Size	Drill Size	Countersink Diameter
	øA <sup>*1</sup>	øY <sup>*2</sup>
	Nom.	Nom.
M1.6	1.8	2.0
M2	2.4	2.6
M2.5	2.9	3.1
M3	3.4	3.6
M4	4.5	4.7
M5	5.5	5.7
M6	6.6	6.8
M8	9.0	9.2
M10	11.0	11.2
M12	13.0	14.2
M16	17.0	18.2
M20	21.0	22.4
M24	25.0	26.4
M30	31.0	33.4
M36	37.0	39.4
M42	43.0	45.6
M48	49.0	52.6



- Notes:  
<sup>\*1</sup> Tolerance H13  
<sup>\*2</sup> Tolerance +0.2 -0

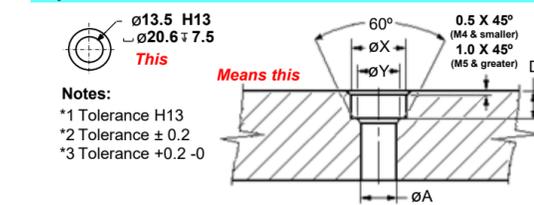
### 6) Metric Thread Installations

- General purpose. "Type 1" tapped holes (HS 259)
- ISO965 threads, coarse pitch
- Tolerance class 6H



Thread	Pitch	Tap Drill		Tapping		Chamfer		For Ref.		
		øA	B <sup>1</sup>	C <sup>2</sup>	D <sup>2</sup>	øE <sup>3</sup>	F	G		
		Nom.	Max.	Min.	Nom.	Min.	Nom.	Tol.	Nom.	
M3	0.5	2.5	2.599	2.459	9.5	6	7.5	3.25 ±0.1	8.778	0.722
M4	0.7	3.3	3.422	3.242	12.5	8	10.1	4.35 ±0.14	11.547	0.953
M5	0.8	4.2	4.334	4.134	16	10	12.4	5.4 ±0.16	14.788	1.212
M6	1	5	5.153	4.917	18.5	12	15	6.5 ±0.2	17.057	1.443
M8	1.25	6.75	6.912	6.647	24	16	19.75	8.625 ±0.25	22.051	1.949
M10	1.5	8.5	8.676	8.376	30	20	24.5	10.75 ±0.3	27.546	2.454
M12	1.75	10.25	10.441	10.106	35	24	29.25	12.875 ±0.35	32.041	2.959
M16	2	14	14.21	13.835	45	32	38	17.0 ±0.4	40.959	4.041
M20 <sup>4</sup>	2.5	17.5	17.744	17.294	56	40	47.5	21.25 ±0.5	50.948	5.052
M24	3	21	21.252	20.752	67	48	57	25.5 ±0.6	60.938	6.062
M30	3.5	26.5	26.771	26.211	83	60	70.5	31.75 ±0.7	75.35	7.65
M36	4	32	32.27	31.67	98	72	84	38.0 ±0.8	88.762	9.238
M42	4.5	37.5	37.799	37.129	114	84	97.5	44.25 ±0.9	103.175	10.825
M48	5	43	43.297	42.587	130	96	111	50.5 ±1.0	117.587	12.413
M56	5.5	50.5	50.796	50.046	150	112	128.5	58.75 ±1.1	135.422	14.578

### 7) Counterbore Holes for Inch LHCS



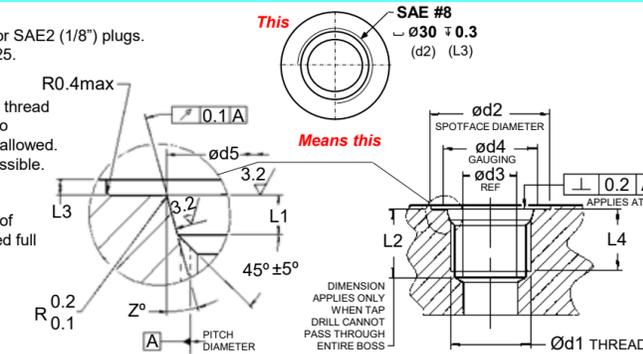
Screw Size	Drill Size	Counterbore Diameter	Countersink Diameter	Counterbore Depth
	øA <sup>*1</sup>	øX <sup>*2</sup>	øY <sup>*3</sup>	D <sup>*2</sup>
	Inch	Inch	Min.	Nom.
#4	0.1120	3.5	5.5	2.0
#8	0.1640	4.9	8.0	2.5
#10	0.1900	5.6	9.5	3.0
1/4	0.2500	7.1	11.1	4.0
5/16	0.3125	8.7	13.5	5.0
3/8	0.0375	10.3	15.9	6.0
1/2	0.5000	13.5	20.6	7.5

All dimensions in millimeters unless otherwise specified

Notes:  
<sup>\*1</sup> Tolerance H13  
<sup>\*2</sup> Tolerance ±0.2  
<sup>\*3</sup> Tolerance +0.2 -0

### 9) SAE Straight Thread Ports

- Notes:  
<sup>\*1</sup> Tolerance ±1.0. Exception: ±0.2 for SAE2 (1/8") plugs.  
<sup>\*2</sup> Recommended drills as per HS 225.  
<sup>\*3</sup> Tolerance +0.13 -0.00  
Diameter ø5 to be concentric with thread pitch diameter within 0.127mm. No longitudinal and spiral tool marks allowed. Annular marks up to 2.5µm permissible.  
<sup>\*4</sup> Tolerance +0.4 -0.0  
<sup>\*5</sup> Tap drill depths given require use of bottoming taps to produce specified full thread lengths.  
<sup>\*6</sup> Recommended spotface depth. Tolerance +0.3 -0.2  
<sup>\*7</sup> Full thread depth  
<sup>\*8</sup> Tolerance ±1°  
<sup>\*9</sup> Standard hydraulic applications: 90 durometer nitrile (N552-90)



d1	Thread		Tap Drill Dia (mm)		Fittings & Plugs (Standard)		Plugs Only (Optional)		ød3 <sup>*2</sup>		ød4		ød5 <sup>*3</sup>		L1 <sup>4</sup>		L2 <sup>5</sup>		L3 <sup>6</sup>		L4 <sup>7</sup>		Z <sup>8</sup>		O-Ring Size <sup>9</sup>	
	INCH	SAE #	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/8"	-2	5/16-24 UNF-2B	6.78	7.04	17	12	6.35	11	9.1	1.9	12	0.3	3.5	10	12"	3-902										
1/4"	-4	7/16-20 UNF-2B	9.73	10.03	21	16	8.7	15	12.4	2.4	14	0.3	3.5	11.5	12"	3-904										
5/16"	-5	1/2-20 UNF-2B	11.32	11.60	23	19	11.2	16	14	2.4	14	0.3	3.5	11.5	12"	3-905										
3/8"	-6	9/16-18 UNF-2B	12.75	13.08	25	21	11.2	18	15.6	2.5	15.5	0.3	3.5	12.7	12"	3-906										
1/2"	-8	3/4-16 UNF-2B	17.32	17.68	30	24	16	22	20.6	2.5	17.5	0.3	5	14.3	15"	3-908										
5/8"	-10	7/8-14 UNF-2B	20.27	20.68	34	28	20	26	23.9	2.5	20	0.3	5	16.7	15"	3-910										
3/4"	-12	1 1/16-12 UN-2B	24.69	25.15	41	34	20	32	29.2	3.3	23	0.3	5	19	15"	3-912										
7/8"	-14	1 3/16-12 UN-2B	27.86	28.32	45	38	25	35	32.3	3.3	23	0.3	5	19	15"	3-914										

