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Introduction - Basic Electrical Connections Principles

Introduction - Basic Electrical Connection Principles

Basic Factors:

The basic factors which influence the design and performance of pressure wire connections are as follows:

1. Creep
2. Surface Oxide
3. Corrosion

A fourth factor, known as thermal effects, is also a consideration, but due to the technical nature and length of this topic, it will not be discussed here.

At the outset it should be pointed out that these factors give rise to much more difficult problems in connections involving aluminum conductors than those encountered in copper to copper connections.

Creep (Cold Flow)

Creep is the cold flow of the metal under pressure and it continues until the pressure reduces to a value at which any further creep is negligible. Creep properties depend on the particular metal or alloy and on its hardness; alloys having less creep than pure metals, and harder metals have less creep than soft metals. In a typical connection, the conductors are generally of pure metal and often of soft temper and therefore, subject to considerable creep. In addition, the condition is further exaggerated when aluminum is the conductor as compared to copper, since its creep rate is many times that of copper.

Effect of Creep: Figure 2 shows typical curves of total contact resistance plotted against total contact force. Curve A shows how the contact resistance continually decreases with increasing contact force. When the full contact force F_1 is reached, the contact resistance reaches the low value of R_1 . In general, the full tightening force on a connector greatly exceeds the maximum force for which there is no appreciable creep. Therefore, the force will gradually settle down to a value after which there will be no further significant creep. Fortunately, however, the resistance does not climb back up along curve A, the tightening curve, but instead it follows a new curve B, the relaxing curve, along which the resistance changes very little until the force relaxes to a value such as F_2 .

Admittedly, the point of "no appreciable creep" is difficult to define. For pure metals, especially in the soft state, there is always some creep, even at very low pressures at room temperature. However, we do know that the pressure required to produce the same creep rate is several times greater for copper than for aluminum. Thus, to permit the same contact force F_2 for aluminum and copper, the contact area A required for aluminum can be expected to be considerably greater than that required for copper. This explains why the contact areas for connectors for aluminum must be considerably greater than for copper and why many light duty connectors for copper are entirely inadequate for aluminum, even when specially plated and when recommended compounds are used on the contact surfaces.

Relaxation: Relaxation of pressure due to creep, or for any other reason, would be a much more difficult factor in a pressure connection were it not for the relationship of contact pressure to contact resistance on the relaxation curve as shown in Figure 2. It is frequently observed that some time after the bolts of a clamp type connector are tightened, the bolt tensions are relaxed appreciably. The question arises as to whether it is necessary to retighten the bolts to the original torque value. In a properly designed connector, retightening is unnecessary since the contact resistance should increase very little due to the relaxation of pressure, as shown by the relaxation curve of Figure 2.

This fact is largely responsible for the successful operation of a compression connector. The application of the compression tool applies very high pressure, establishing very low contact resistance. The removal of the compression tool releases a very large proportion of this pressure, and creep further relaxes this pressure. Fortunately, the contact resistance increases very little due to this pressure relaxation.

Contact Force: The previous analysis shows that the total contact force largely determines the contact resistance. Thus, to achieve the desired low value of contact resistance, the proper size and number of bolts in a clamp type connector must be supplied, and the compression tool must apply the proper force to a compression connector. In addition, the connector must be designed with sufficient structural strength, contact area, and resilience, to assure that the contact force cannot relax beyond the point where contact resistance begins to rise appreciably, as shown in Figure 2.

Surface Oxide

The contact of pure metallic surfaces cannot be assured in practical connections. Surface contamination must be expected, especially surface oxidation. These surface films are insulators as far as contact resistance is concerned, and they must be broken to achieve metal to metal contact to make an adequate electrical connection. The difficulty of breaking the film depends on the nature of the film, its thickness, and the metal on which it is formed.

Copper oxide is generally broken down by reasonably low values of contact pressure. Unless the copper is badly oxidized, good contact can be obtained with very little or no cleaning.

Silver oxide is even more easily broken down by the contact pressure; and since silver oxide forms less readily at elevated temperatures, silver contact surfaces are preferred over copper when used for high temperatures. For this reason, it is considered good practice to silver plate copper contact surfaces that must operate at temperatures over 200 °C.

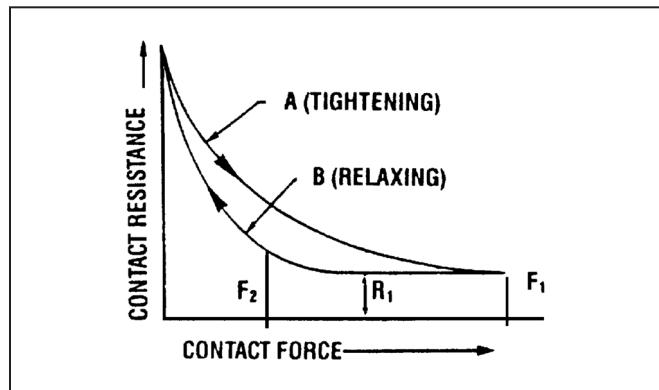


Figure 2

On the other hand, aluminum oxide is a hard, tenacious, high resistance film that forms very rapidly on the surface of aluminum exposed to air. In fact, it is the toughness of this film that gives aluminum its good corrosion resistance. The oxide film that forms after more than a few hours is too thick and tough to permit a low resistance contact without cleaning. The aluminum oxide film is transparent so that even the bright and clean appearance of an aluminum connector is no assurance that the low contact resistance can be attained without cleaning.

In addition to the necessity for cleaning the oxide from aluminum, the surface should be covered with a good connector compound to prevent the oxide from reforming. Common practice is to clean the surface

with a wire brush or emery cloth. The compound should be applied immediately after cleaning, or the compound should be put on first and the surface scraped through the compound. Present practice is to scratch brush dry and to apply the compound immediately thereafter. This allows a more thorough job of cleaning the conductor.

Introduction - Basic Electrical Connections Principles

Introduction - Basic Electrical Connection Principles (continued)

Contact Compounds: Petrolatum or No-Oxid are good contact surface compounds for aluminum, but BURNDY® PENETROX™ A, a petroleum type compound containing zinc dust, has the additional advantage of assisting in the breaking down of the contact resistance. How this is accomplished is not certain, but it

appears that the zinc particles of PENETROX™ A probably act as current bridges in the breaks in the oxide film. For more complete information about the PENETROX™ line of compounds, refer to the Accessories section of this catalog.

Interstrand Resistance: The high contact resistance due to the oxide on the strands of an aluminum cable may be responsible for a poor distribution of current among the strands on the cable. Thus, the outer strands may carry much more than their share of the current and overheating of the cable may result. Tests have shown that even on new cable this effect of interstrand resistance can be considerable unless a good contact compound is used. The clamping action tends to break down the oxide and force the compound between the strands. This is particularly true of compression connectors due to the very high unit pressures developed.

The most effective way to break down interstrand resistance of aluminum cable is to use compression connectors filled with a compound having zinc particles. Then, when the end of the cable is inserted in the connector, the compound is forced between the strands where it very effectively breaks down the interstrand resistance upon application of the compressive force.

Plating Aluminum: Plating the contact surfaces of aluminum connectors will prevent the formation of aluminum oxide. Electro-tin, cadmium and zinc platings have been used for this purpose. However, the use of a plated aluminum connector does not make it less necessary to scratch brush the aluminum conductor, nor does it reduce the need for a good contact compound. Additional problems are introduced due to the plating on aluminum which render it of very doubtful value over the proper use of base aluminum. This will be more fully discussed later.

Corrosion

The electrical conductivity and mechanical strength of an electrical connection must remain stable under the deteriorating influences of the environment. This deterioration is corrosion. It is the electrolytic action of moisture and other elements of the atmosphere in conjunction with the metals of the connection. If the conductors and connectors are of copper or a corrosion resistant copper alloy, corrosion is usually a minor factor. However, it is a very vital factor if aluminum is involved.

If moisture can be kept away from the connection, corrosion will not be a factor. The electrical connection of a high voltage splice on insulated cable is generally free from corrosion since the taping may be used to avoid corrosion on bare cable, provided it excludes moisture. It is difficult to get a good tape seal to the conductor itself, especially on stranded cable. If moisture does penetrate the taping, it will not dry out as readily as if the joint were untaped. Various plastic materials are available today for covering low voltage connections or for bare conductor connections on high voltage. Unless such coverings are completely moisture-proof, it is better to rely on installation with a good contact compound, using a connector designed to resist corrosion.

Galvanic Action: Whenever dissimilar metals are in the presence of an electrolyte, a difference in electric potential is developed. One metal becomes the cathode and receives a positive charge. The other becomes the anode and receives a negative charge. When these metals are in contact, an electrical current will flow, as in the case of any short-circuited electric cell. This electrolytic action causes an attack of the anodic metal, leaving the cathodic metal unharmed. The extent of the attack is proportional to the strength of the electrolytic current, which in turn is proportional to the electric potential difference developed.

The magnitude of the potential difference generated between two dissimilar metals can be seen by the position of these metals in the electrolytic series. Figure 3 is such a series. When two metals are in contact in an electrolyte, the one higher up in this series is the anode, the corroded metal, while the one lower is the cathode, the protected metal. The further apart the metals are in this series, the greater the electrolytic potential difference, and the greater the attack to the anodic metal.

Note that copper and aluminum are quite far apart in the series, copper being cathodic and aluminum anodic. Hence, when aluminum and copper are in contact in an electrolyte, the aluminum can be expected to be severely attacked.

Crevice Corrosion: Electrolytic attack can also occur between like metals due to a phenomenon known as oxygen concentration cell or crevice corrosion. Since oxygen is necessary for corrosive action, a variation in the concentration of oxygen where a metal is exposed to an electrolyte will generate a difference of potential, and cause a corrosive attack in the oxygen starved area. Thus, since an electrolyte in a deep crevice is freely exposed to the air at the outside, the concentration of oxygen will be greatest at the mouth of the crevice. Then corrosion can be expected to occur in the crevice remote from the surface. Crevice corrosion can be prevented if the crevice is filled with a compound to exclude moisture. Thus, within the contact groove of an aluminum connector containing an aluminum conductor, there will be numerous crevices in which corrosion will take place unless a good connector compound is applied during installation. Copper, being a more noble metal, appears to be much less subject to crevice corrosion.

Corrosion Testing: The effectiveness of an electrical connection to resist corrosion can be tested in the laboratory under conditions designed to greatly accelerate the natural corrosive conditions of actual service. The most widely accepted means is the standard salt spray chamber. In this chamber the specimens are placed in a salt fog made by atomizing a 20% salt solution at 100° F.

BURNDY, as well as other manufacturers and utility companies, have done a great deal of testing and a considerable area of agreement has been reached. There are, however, minor differences in recommended practices. The problem is concerned with aluminum and aluminum to copper connections since the effect of corrosion on copper to copper connections is far less serious. Let us study the recommended practices.

Aluminum to Aluminum Connections: For joining aluminum to aluminum conductors, there is little disagreement that an aluminum bodied connector is the proper choice, since this obviously eliminates the galvanic corrosion of dissimilar metals. However, even in this case, care must be taken to prevent crevice corrosion and to select an alloy of aluminum for the connector body that is free from cracking due to stress corrosion.

Aluminum to Copper Connections: Similarly, for joining aluminum to copper conductors, an aluminum bodied connector is the best choice since it prevents galvanic corrosion of the aluminum conductor, the most vulnerable element to attack in the connection. Realizing this, BURNDY initiated a research program aimed at finding the best way to make an aluminum connector suitable for joining aluminum to copper conductors.

This led to the evolution of the "Massive Anode Principle" of connector design for joining conductors of dissimilar metal. On the basis of this principle, properly designed, all-aluminum connectors became available for universal use in joining aluminum to aluminum or aluminum to copper conductors.

Massive Anode Principle: By making the aluminum connector massive in comparison to the copper conductor, when the copper conductor emerges from the connector, the electrolytic current density over the exposed face of the aluminum connector is greatly reduced. This is schematically represented in Figure 4. Since the rate of corrosion is directly related to the current density on the surface of the anodic material, the relatively large face of the aluminum connector will suffer only minor attack.

Introduction - Basic Electrical Connections Principles

Introduction - Basic Electrical Connection Principles (continued)

+ LESS NOBLE (ANODIC)

- ↓ Magnesium
- ↓ Magnesium alloys
- ↓ Zinc
- ↓ Aluminum 1100
- ↓ Cadmium
- ↓ Aluminum 2024-T4
- ↓ Steel or Iron
- ↓ Cast Iron
- ↓ Chromium Iron (Active)
- ↓ Ni-Resist
- ↓ Type 304 Stainless (Active)
- ↓ Type 316 Stainless (Active)
- ↓ Lead Tin Solders
- ↓ Lead
- ↓ Tin
- ↓ Nickel (Active)
- ↓ Inconel
- ↓ Brasses
- ↓ Copper
- ↓ Bronzes
- ↓ Copper-Nickel alloys
- ↓ Monel
- ↓ Silver Solder
- ↓ Nickel (Passive)
- ↓ Inconel (Passive)
- ↓ Chromium-Iron (Passive)
- ↓ Type 304 Stainless (Passive)
- ↓ Type 316 Stainless (Passive)
- ↓ Silver
- ↓ Titanium
- ↓ Graphite
- ↓ Gold
- ↓ Platinum

- MORE NOBLE (CATHODIC)

Figure 3

In addition, because the aluminum connector body is massive in the region where the corrosion occurs, the small loss of metal caused by corrosion is insignificant, even after long periods of service. Furthermore, the connector design should be such that clamping bolts, and areas of high stress which provide structural strength, are not in the regions subject to galvanic attack.

The effectiveness of this theory has been amply demonstrated in salt spray corrosion tests in which the connectors were subject to 1,000 hours in the salt spray fog with only minor corrosive pitting adjacent to the copper conductor, as seen in Figure 5. In addition, the aluminum conductor was completely protected, and the joint resistance remained virtually unchanged. The test involved a wide variety of sizes and types of connectors showing the effectiveness for small service connectors as well as large power connectors. Figure 6 shows a large all aluminum clamp type T connector installed on 3-1/2" diameter copper run and 750 kcmil aluminum tap. The figure shows this connector which was opened up after 1,400 hours of the salt spray test. Note that the contact surfaces are bright and clean and the only evidence is minor pitting along the faces adjacent to the copper.

*It should be emphasized that a good compound should be used on the contact surfaces whether aluminum or copper is used in an aluminum connector.

Position of Conductor: A properly designed aluminum connector for joining aluminum to copper must provide adequate separation between the conductors to prevent electrolytic attack on the aluminum conductor. Even then, it is good practice to install the aluminum conductor above the copper conductor if possible. This will prevent pitting of the aluminum conductor due to copper salts being washed over the aluminum.

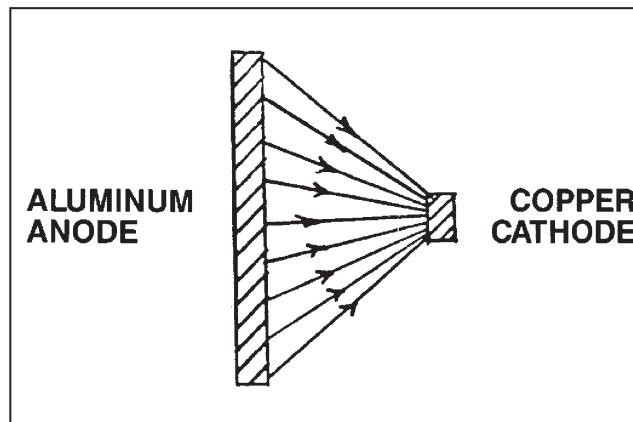


Figure 4

Plated Aluminum Connectors: Plating has been used as a means to make an aluminum connector suitable for copper conductor. Such platings as copper, zinc, tin and cadmium have been used. The plating of aluminum is much more critical than plating a more noble metal such as copper. In addition, a preplate, usually of copper or brass, must be applied, thus introducing numerous metals and further possibilities for galvanic corrosion.

To be effective in reducing galvanic corrosion between the copper conductor and the aluminum connector, the plated metal must be closer in the Electrolytic Series to copper than is aluminum. It must therefore, be cathodic to aluminum. Since porosity and minor scratches are always present, galvanic action can be expected in the presence of moisture, resulting in attack of the aluminum under the plating. Corrosion tests reveal attack in the form of a mottled appearance and flaking of the plating.

In addition, the presence of plated metal can cause galvanic attack of the aluminum conductor, thus reducing the protection offered to this conductor in an aluminum connector.

Introduction - Basic Electrical Connections Principles

Introduction - Basic Electrical Connection Principles (continued)

Cleaning and the Use of Compound: It should be emphasized that when aluminum connectors or conductors are involved, proper cleaning of the aluminum and the use of a good connector compound, such as BURNDY PENETROX™ A, are essential for trouble-free service. BURNDY, as well as other manufacturers, provide the contact grooves with a coating to make it unnecessary to clean the connectors, but in all cases the aluminum conductor should be cleaned by means such as scratch brushing, and immediately coated with the connector compound.

To simplify the application of the compound, and to assure its use, almost all BURNDY aluminum connectors, except the large clamp type substation connectors, are supplied factory filled with PENETROX™ compound. For the tubular compression connectors, the tubular barrels are sufficiently filled with PENETROX™ and capped. For other types, the contact grooves are filled with PENETROX™ and enclosed in plastic packaging in a process called 'stripsealing'.

Clamp vs. Compression: In general, a compression connection can be expected to be more corrosion resistant than a clamp connection. The high pressures applied to a compression connector more effectively seal the contact against the penetration of moisture. The tubular sleeve of a compression connector has no side openings such as exist in clamp connectors between the clamping members. On the other hand, the clamp connector can be made more corrosion resistant if the conductor grooves conform more closely with the conductor contour. Thus a clamp connector made to accommodate a wide range of conductor sizes cannot be expected to be as corrosion resistant as one designed for one specific conductor size. Nevertheless, the differences in effectiveness of various designs can be minimized if a good contact compound is used.

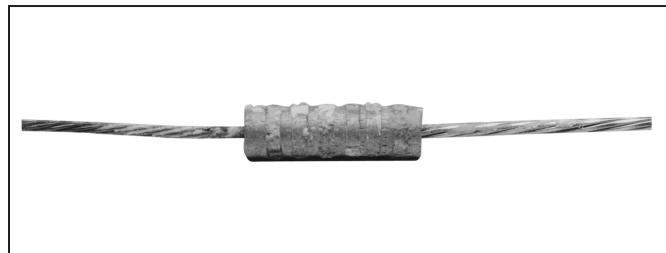


Figure 5

Negligible Corrosion of Severe Salt Spray on Compression Connector Joining Aluminum to Copper.

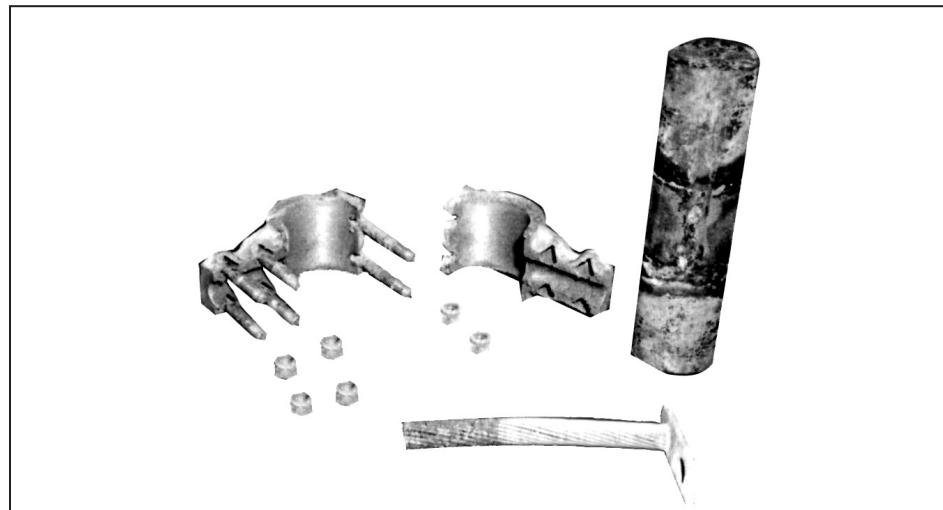


Figure 6

Large Aluminum Bolted Connector Joining Copper Run to Aluminum Tap After Severe Salt Spray Test.

Hardware Data

HARDWARE DATA

Recommended Tightening Torque

The hardware used in connectors must be compatible with the connector material, have high mechanical strength and be corrosion resistant.

Copper alloy connectors have hardware made of DURIUM™, which is the BURNDY trade name for silicon bronze alloy ASTMB99. This material was first introduced by BURNDY in 1927 for use in outdoor construction and today is the standard throughout the industry.

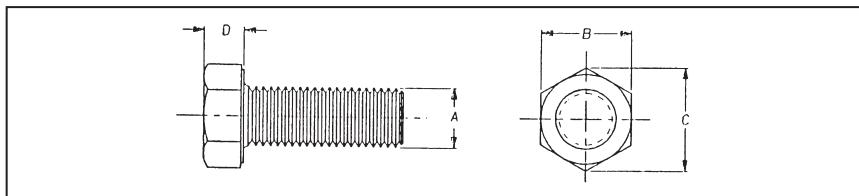
Aluminum connectors generally have aluminum alloy hardware. The bolts are 2024T4 and anodized to resist corrosion. The nuts are 6061T6, which is resistant to corrosion and does not require anodizing. Bolts are lubricated to eliminate galling and to provide consistent clamping forces.

The size material for clamping hardware are selected to provide the required force when tightened to the recommended torque. To reduce or greatly exceed the recommended torque can adversely affect the performance of the connector.

Steel Hardware	
Bolt Size	Recommended Torque (Inch Pounds)
1/4 - 20	80
5/16 - 18	180
3/8 - 16	240
1/2 - 13	480
5/8 - 11	660
3/4 - 10	1050

Aluminum Hardware	
Bolt Size	Recommended Torque (Inch Pounds)
1/2 - 13	300
5/8 - 11	480
3/4 - 10	650

DURIUM™ (Silicon Bronze) Hexagonal Bolt Data



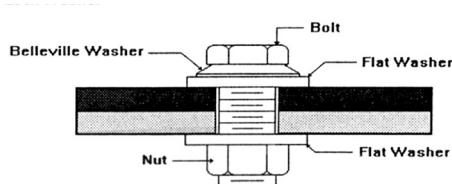
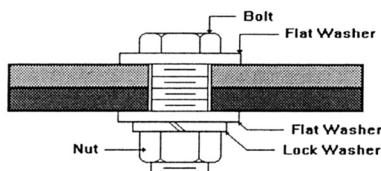
DURIUM™ (Silicon Bronze) Hardware							
Catalog Number Series*	"A" Bolt Size	"B"	"C"	"D"	Recommended Torque (in-lb)**	Min. Breaking Force (lb)	Min. Shearing Force (lb)
25X__HEB	1/4 - 20	7/16	.50	.16	80	1,780	990
31X__HEB	5/16 - 18	1/2	.56	.21	180	2,930	1,640
38X__HEB	3/8 - 16	9/16	.65	.24	240	4,350	2,430
50X__HEB	1/2 - 13	3/4	.87	.32	480	7,950	4,460
62X__HEB	5/8 - 11	15/16	1.08	.40	660	12,700	7,100
75X__HEB	3/4 - 10	1-1/8	1.30	.48	1050	17,510	10,540

* __ __ is substituted for bolt length; Consult sales representative for available lengths

**These torque values develop maximum bolt preload

This drawing is based on BURNDY engineering specification

Recommended Termination Hardware



HARDWARE DATA (continued)**Recommended Tightening Torque per UL486A & UL486B****Table 21 - Tightening torque for screws**

Test Conductor Size Installed in Connector		Tightening Torque, N·m (lbf-in)							
		Slotted Head No. 10 and Larger*				Hexagonal Head - External Drive Socket Wrench			
		Slot Width - 1.2mm (.047 in) or Less and Slot Length - 6.4mm (1/4 in.) or less		Slot Width - Over 1.2mm (.047 in) or Slot Length - Over 6.4mm (1/4 in.)		Split-Bolt Connectors		Other Connectors	
AWG or kcmil	mm ²	A	B	A	B	A	B	A	B
30 - 10	.05 - 5.3	1.7 (15)	2.3 (20)	2.8 (25)	4.0 (35)	7.3 (65)	9.0 (80)	6.8 (60)	8.5 (75)
8	8.4	2.3 (20)	2.8 (25)	3.4 (30)	4.5 (40)	7.3 (65)	9.0 (80)	6.8 (60)	8.5 (75)
6 - 4	13.2 - 21.2	2.8 (25)	4.0 (35)	4.0 (35)	5.1 (45)	15.3 (135)	18.6 (165)	10.2 (90)	12.4 (110)
3	26.7	2.8 (25)	4.0 (35)	4.5 (40)	5.6 (50)	25.4 (225)	31.1 (275)	14.1 (125)	16.9 (150)
2	33.6	3.4 (30)	4.5 (40)	4.5 (40)	5.6 (50)	25.4 (225)	31.1 (275)	14.1 (125)	16.9 (150)
1	42.4	-	-	4.5 (40)	5.6 (50)	25.4 (225)	31.1 (275)	14.1 (125)	16.9 (150)
1/0 - 2/0	53.5 - 67.4	-	-	4.5 (40)	5.6 (50)	35.6 (315)	43.5 (385)	16.9 (150)	20.3 (180)
3/0 - 4/0	85.0 - 107.2	-	-	4.5 (40)	5.6 (50)	45.2 (400)	56.5 (500)	22.6 (200)	28.2 (250)
250 - 350	127 - 177	-	-	4.5 (40)	5.6 (50)	62.1 (550)	73.4 (650)	28.2 (250)	36.7 (325)
400	203	-	-	4.5 (40)	5.6 (50)	76.3 (675)	93.2 (825)	28.2 (250)	36.7 (325)
500	253	-	-	4.5 (40)	5.6 (50)	76.3 (675)	93.2 (825)	33.9 (300)	42.4 (375)
600 - 750	304 - 380	-	-	4.5 (40)	5.6 (50)	90.4 (800)	113.0 (1000)	33.9 (300)	42.4 (375)
800 - 1000	406 - 508	-	-	4.5 (40)	5.6 (50)	111.7 (900)	124.3 (1100)	45.2 (400)	56.5 (500)
1250 - 2000	635 - 1000	-	-	-	-	111.7 (900)	124.3 (1100)	56.5 (500)	67.8 (600)

* For values of slot width or length not corresponding to those specified, select the largest torque value associated with the conductor size. Slot width is the nominal design value. Slot length shall be measured at the bottom of the slot.

Recommended Tightening Torque per UL486A & UL486B**Table 22 - Tightening torque for slotted head screws smaller than No. 10 intended for use with 8 AWG (8.4 mm²) or smaller conductors**

Slot Length of Screw*		Tightening Torque, N·m (lbf-in)			
		Slot Width of Screw Smaller than 1.2 mm (.047 in.) ^b		Slot Width of Screw 1.2mm (.047 in.) and larger**	
mm	inch	A	B	A	B
Less than 4	Less than 5/32	0.68 (6)	0.79 (7)	0.79 (7)	1.0 (9)
4	5/32	0.68 (6)	0.79 (7)	1.1 (10)	1.4 (12)
4.8	3/16	0.68 (6)	0.79 (7)	1.1 (10)	1.4 (12)
5.6	7/32	0.68 (6)	0.79 (7)	1.1 (10)	1.4 (12)
6.4	1/4	0.79 (7)	1.0 (9)	1.1 (10)	1.4 (12)
7.1	9/32	-	-	1.4 (12)	1.7 (15)
Above 7.1	Above 9/32	-	-	1.8 (16)	2.3 (20)

* For slot lengths of intermediate values, select torques pertaining to next shorter slot length.

Also see Table 21 for screws with multiple tightening means.

Slot length shall be measured at the bottom of the slot.

** Slot width is the nominal design value

Hardware Data

HARDWARE DATA (continued)

Recommended Tightening Torque per UL486A & UL486B

Table 23 - Tightening torque for screws with recessed allen or square drives

Socket Width Across Flats*		Tightening Torque, N·m (lbf-in)	
mm	inch	A	B
3.2	1/8	4.0 (35)	5.1 (45)
4.0	5/32	9.0 (80)	11.3 (100)
4.8	3/16	11.3 (100)	13.6 (120)
5.6	7/32	13.6 (120)	16.9 (150)
6.4	1/4	16.9 (150)	25.4 (225)
7.9	5/16	25.4 (225)	33.9 (300)
9.5	3/8	33.9 (300)	45.2 (400)
12.7	1/2	45.2 (400)	56.6 (500)
14.3	9/16	56.6 (500)	67.8 (600)

* See Table 21 for screws with multiple tightening means

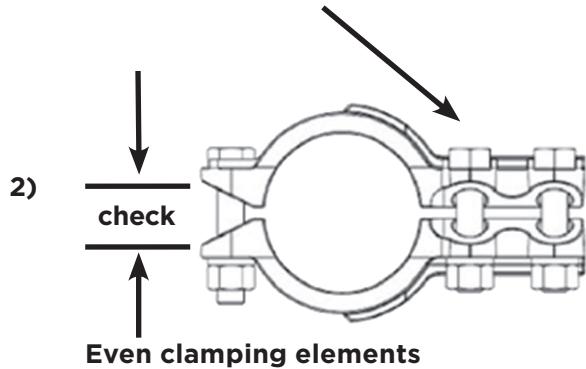
Recommended Clamping on Bolted Connectors:

When installing a bolted connector, an appropriate sequence needs to be followed.

INSTALLATION INSTRUCTIONS:

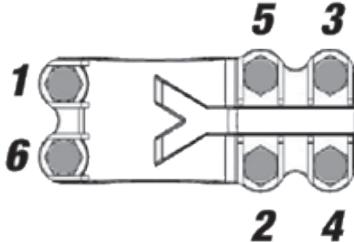
1. Nuts need to be tightened up to 30% of expected torque.
2. A check needs to be done to ensure the clamping elements are even.
3. Tightening has to follow a sequence (1-6) as shown below. As a general rule, the torque has to be applied to the nut. For ease of installation most connectors are designed for one wrench installation. A torque wrench is recommended when tightening the nut to ensure the proper torque is applied.

1) Tightened up to 30%



BURNDY offers three sizes of professional grade torque wrenches, catalog number **BTW30150** to be used on connectors requiring 30-150 in-lbs., the **BTW150750**, designed for 150-750 in-lbs., and the **BTW1575F12**, designed for 15 - 75 ft-lbs. These are micro-adjustable "click-type" torque wrenches featuring an easy-to-read scale that can be easily matched to the recommended torque of our mechanical connector products.

3)



Copper Tube (Bus)

Size of Tube IPS	Diameter of Tube (Inches)		Wall Thickness (Inches)
	Outside	Inside	
STANDARD PIPE SIZES			
1/4"	0.540	0.375	0.082
3/8"	0.675	0.494	0.090
1/2"	0.840	0.625	0.107
3/4"	1.050	0.822	0.114
1"	1.315	1.062	0.126
1-1/4"	1.660	1.368	0.146
1-1/2"	1.900	1.600	0.150
2"	2.375	2.062	0.156
2-1/2"	2.875	2.500	0.187
3"	3.500	3.062	0.219
3-1/2"	4.000	3.500	0.250
4"	4.500	4.000	0.250
4-1/2"	5.000	4.500	0.250
5"	5.563	5.063	0.250
6"	6.625	6.125	0.250
EXTRA HEAVY PIPE SIZES			
1/4"	0.540	0.294	0.123
3/8"	0.675	0.421	0.127
1/2"	0.840	0.542	0.149
3/4"	1.050	0.736	0.157
1"	1.315	0.951	0.182
1-1/4"	1.660	1.272	0.194
1-1/2"	1.900	1.494	0.203
2"	2.375	1.933	0.221
2-1/2"	2.875	2.315	0.280
3"	3.500	2.892	0.304
3-1/2"	4.000	3.358	0.321
4"	4.500	3.818	0.341
4-1/2"	5.000	4.250	0.375
5"	5.563	4.813	0.375
6"	6.625	5.751	0.437

Size of Tube IPS	Diameter of Tube (Inches)		Wall Thickness (Inches)
	Outside	Inside	
DOUBLE EXTRA HEAVY PIPE SIZES			
1/2"	0.840	0.252	0.294
3/4"	1.050	0.434	0.308
1"	1.315	0.599	0.358
1-1/4"	1.660	0.896	0.382
1-1/2"	1.900	1.100	0.400
2"	2.375	1.503	0.436
2-1/2"	2.875	1.771	0.552
3"	3.500	2.300	0.600
3-1/2"	4.000	2.728	0.636
4"	4.500	3.152	0.674
4-1/2"	5.000	3.580	0.710
5"	5.563	4.063	0.750
6"	6.625	4.897	0.864

Tube dimensions (excepting wall thickness of double extra heavy) taken from A.S.T.M. Specification B42-33.

Tubular values based on a density of 0.322 pound per cubic inch.

* Conductivity of 98% I.A.C.S. at 20° C or 68° F

Cable Data

Solid Copper Wire (ASTM B1, B2, & B3)

Size AWG (Solid)	Wire Dia (Inch)	Hard Drawn	Medium Drawn	Soft Drawn
		Normal Breaking Load (Pounds)	Minimum Breaking Load (Pounds)	Elongation in 10 in. % Min.
18	.040	85.8	67.6	25
17	.045	107.5	84.7	25
16	.050	135.2	106.2	25
15	.057	170.0	133.0	25
14	.064	213.8	166.6	25
13	.071	268.2	208.0	25
12	.080	337.0	261.6	25
11	.090	422.5	327.6	25
10	.101	529.2	410.4	25
9	.114	661.0	514.2	30
8	.128	826.0	643.9	30
7	.144	1,030.0	806.6	30
6	.162	1,280.0	1,010.0	30
5	.181	1,591.0	1,265.0	30
4	.204	1,970.0	1,584.0	30
3	.229	2,439.0	1,984.0	30
2	.257	3,003.0	2,450.0	30
1	.289	3,688.0	3,024.0	30
1/0	.324	4,519.0	3,730.0	35
2/0	.364	5,518.0	4,599.0	35
3/0	.409	6,722.0	5,667.0	35
4/0	.460	8,143.0	6,980.0	35

Compact Stranded Copper Cable (ASTM B496)

Conductor Size KCMIL	Number of Wires AWG	Conductor Dia (in)	
		611	1.060
1000	611	0.999	0.938
900	611	0.908	0.877
800	611	0.845	0.813
750	611	0.775	0.736
700	372	0.700	0.659
650	372	0.616	0.570
600	372	0.520	0.475
550	372	0.423	0.376
500	372	0.336	0.299
450	372	0.213	0.268
400	372	0.169	0.134
350	372	0.134	
300	372		
250	372		
	4/0	193	
	3/0	193	
	2/0	193	
	1/0	193	
	1	193	
	2	7	
	4	7	
	6	7	
	8	7	

¹ 58 Wires Minimum² 35 Wires Minimum³ 18 Wires Minimum

Stranded Copper Wire (ASTM B8 Excluding Breaking Loads)

Size		A.S.T.M. Strandings			Hard Drawn	Medium Drawn	Soft Drawn
Stranded		Class	No. of Wires	Cable Diameter (Inches)	Minimum Breaking Load (Pounds)		
Circular Mils	AWG						
1,022	20	B	7	0.036	50.0	40.67	32.1
1,624	18	B	7	0.045	79.0	63.91	51.0
2,583	16	B	7	0.057	124.7	100.4	81.1
4,107	14	B	7	0.072	197.1	157.7	124.2
6,530	12	B	7	0.091	311.1	247.7	197.5
10,380	10	B	7	0.116	491.7	388.9	314.0
13,090	9	B	7	0.130	618.2	487.4	395.9
16,510	8	B	7	0.146	777.2	610.7	499.2
20,820	7	B	7	0.164	977.1	765.2	629.5
26,250	6	B	7	0.184	1,288.0	958.6	793.8
33,100	5	B	7	0.206	1,542.0	1,201.0	1,001.0
41,740	4	AA	3	0.254	1,879.0	1,465.0	1,213.0
41,740	4	B&A	7	0.232	1,938.0	1,505.0	1,262.0
52,630	3	AA	3	0.285	2,359.0	1,835.0	1,530.0
52,630	3	B&A	7	0.260	2,433.0	1,885.0	1,592.0
66,370	2	AA	3	0.320	2,913.0	2,299.0	1,929.0
66,370	2	B&A	7	0.292	3,045.0	2,361.0	2,007.0
83,690	1	AA	3	0.360	3,621.0	2,879.0	2,432.0
83,690	1	A	7	0.328	3,804.0	2,958.0	2,432.0
83,690	1	B	19	0.332	3,899.0	3,037.0	2,531.0
105,500	1/0	A&A	7	0.368	4,752.0	3,705.0	3,067.0
105,500	1/0	-	12	0.390	4,841.0	3,755.0	3,191.0
105,500	1/0	B	19	0.373	4,901.0	3,805.0	3,191.0
133,100	2/0	A&A	7	0.414	5,926.0	4,640.0	3,867.0
133,100	2/0	-	12	0.438	6,048.0	4,703.0	3,867.0
133,100	2/0	B	19	0.419	6,152.0	4,765.0	4,024.0
167,800	3/0	A&A	7	0.464	7,366.0	5,812.0	4,876.0
167,800	3/0	-	12	0.492	7,556.0	5,890.0	4,876.0
167,800	3/0	B	19	0.470	7,698.0	5,970.0	5,074.0
211,600	4/0	A&A	7	0.522	9,154.0	7,278.0	6,149.0
211,600	4/0	-	12	0.522	9,483.0	7,378.0	6,149.0
211,600	4/0	B	19	0.528	9,617.0	7,479.0	6,149.0

Cable Data**Stranded Copper Wire (ASTM B8 Excluding Breaking Loads) (continued)**

Size	A.S.T.M. Strandings			Hard Drawn	Medium Drawn	Soft Drawn
Circular Mils	Class	No. of Wires	Cable Diameter (Inches)	Minimum Breaking Load (Pounds)		
250 kcmil	AA	12	0.600	11,130	8,717	7,265
250 kcmil	A	19	0.574	11,360	8,986	7,265
250 kcmil	B	37	0.575	11,560	8,952	7,559
300 kcmil	AA	12	0.657	13,170	10,390	8,718
300 kcmil	A	19	0.628	13,510	10,530	8,718
300 kcmil	B	37	0.630	13,870	10,740	9,071
350 kcmil	AA	12	0.710	15,140	12,040	10,170
350 kcmil	A	19	0.679	15,590	12,200	10,170
350 kcmil	B	37	0.681	16,060	12,450	10,580
400 kcmil	A&AA	19	0.726	17,810	13,950	11,620
400 kcmil	B	37	0.728	18,320	14,140	11,620
450 kcmil	AA	19	0.770	19,750	15,590	13,080
450 kcmil	B&A	37	0.772	20,450	15,900	13,080
500 kcmil	AA	19	0.811	21,950	17,320	14,530
500 kcmil	B&A	37	0.813	22,510	17,550	14,530
600 kcmil	A&AA	37	0.891	27,020	21,060	17,440
600 kcmil	B	61	0.893	27,530	21,350	18,140
700 kcmil	AA	37	0.963	31,170	24,410	20,340
700 kcmil	B&A	61	0.964	31,820	24,740	20,340
750 kcmil	AA	37	0.997	33,400	26,150	21,790
750 kcmil	B&A	61	0.998	34,090	26,510	21,790
800 kcmil	AA	37	1.029	35,120	27,710	23,250
800 kcmil	B&A	61	1.031	36,360	28,270	23,250
900 kcmil	AA	37	1.092	39,510	31,170	26,150
900 kcmil	B&A	61	1.094	40,520	31,590	26,150
1000 kcmil	AA	37	1.151	43,830	34,400	29,060
1000 kcmil	B&A	61	1.152	45,030	35,100	29,060
1250 kcmil	A	61	1.288	55,670	43,590	36,320
1250 kcmil	B	91	1.289	56,280	43,880	36,320
1500 kcmil	A	61	1.411	65,840	51,950	43,590
1500 kcmil	B	91	1.412	67,540	52,650	43,590
1750 kcmil	A	91	1.526	77,930	61,020	50,850
1750 kcmil	B	127	1.526	78,800	61,430	50,850
2000 kcmil	A	91	1.630	87,790	69,270	58,120
2000 kcmil	B	127	1.632	90,050	70,210	58,120

Flexible Copper Stranded Cable

Conductor Size kcmil or B & S G (AWG)	# Strands	Strand Diameter	Nominal Diameter	Class
8	41	.0201	.156	I
8	49	.0184	.166	G
8	133	.0111	.167	H
8	168	.010	.157	K
8	420	.0063	.162	M
7	49	.0206	.185	G
7	52	.0201	.185	I
7	133	.0125	.188	H
7	210	.010	.179	K
7	532	.0063	.196	M
6	49	.0231	.208	G
6	63	.0201	.207	I
6	133	.0140	.210	H
6	266	.010	.210	K
6	665	.0063	.215	M
5	49	.0260	.234	G
5	84	.0201	.235	I
5	133	.0158	.237	H
5	336	.010	.235	K
5	836	.0063	.240	M
4	49	.0292	.263	G
4	105	.0201	.263	I
4	133	.0177	.266	H
4	420	.010	.272	K
4	1064	.0063	.269	M
3	49	.0328	.295	G
3	133	.0199	.299	I
3	133	.0201	.291	H
3	532	.010	.304	K
3	1323	.0063	.305	M
2	49	.0368	.331	G
2	133	.0223	.335	I
2	161	.0201	.319	H
2	665	.010	.338	K
2	1666	.0063	.337	M
1	133	.0251	.377	G
1	210	.0201	.367	I
1	259	.018	.378	H
1	836	.010	.397	K
1	2107	.0063	.376	M
1/0	133	.0282	.423	I
1/0	259	.0202	.424	G
1/0	266	.0201	.441	H
1/0	1064	.010	.451	K
1/0	2646	.0063	.423	M

Conductor Size kcmil or B & S G (AWG)	# Strands	Strand Diameter	Nominal Diameter	Class
2/0	133	.0316	.474	G
2/0	259	.0227	.477	I
2/0	342	.0201	.500	H
2/0	1323	.010	.470	K
2/0	3325	.0063	.508	M
3/0	133	.0355	.533	G
3/0	259	.0255	.536	I
3/0	418	.0201	.549	H
3/0	1666	.010	.533	K
3/0	4256	.0063	.576	M
4/0	133	.0399	.599	G
4/0	259	.0286	.601	I
4/0	532	.0201	.613	H
4/0	2107	.010	.627	K
4/0	5320	.0063	.645	M
250	259	.0311	.650	G
250	427	.0242	.653	I
250	637	.0201	.682	H
250	2499	.010	.682	K
250	6384	.0063	.713	M
300	259	.0340	.714	G
300	427	.0265	.716	I
300	735	.0201	.737	H
300	2989	.010	.768	K
300	7581	.0063	.768	M
350	259	.0368	.773	G
350	427	.0286	.772	I
350	882	.0201	.800	H
350	3458	.010	.809	K
350	8806	.0063	.825	M
400	259	.0393	.825	G
400	427	.0306	.826	I
400	980	.0201	.831	H
400	3990	.010	.878	K
400	10101	.0063	.901	M
450	259	.0417	.876	I
450	427	.0325	.878	G
450	1127	.0201	.894	H
450	4522	.010	.933	K
450	11396	.0063	.940	M
500	259	.0439	.922	G
500	427	.0342	.923	I
500	1225	.0201	.941	H
500	5054	.010	.988	K
500	12691	.0063	.997	M

Cable Data

Flexible Copper Stranded Cable (continued)

Conductor Size kcmil or B & S G (AWG)	# Strands	Strand Diameter	Nominal Diameter	Class
600	427	.0375	1.013	G
600	703	.0292	1.022	I
600	1470	.0201	1.027	H
600	5985	.010	1.125	K
600	14945	.0063	1.084	M
700	427	.0405	1.094	G
700	703	.0316	1.106	I
700	1729	.0201	1.194	H
700	6916	.010	1.207	K
700	17507	.0063	1.183	M
800	427	.0433	1.169	G
800	703	.0337	1.180	I
800	1995	.0201	1.290	.H
800	7980	.010	1.305	K
800	20069	.0063	1.256	M
900	427	.0459	1.239	G
900	703	.0358	1.253	I
900	2261	.0201	1.372	H
900	9065	.010	1.323	K
900	22631	.0063	1.331	M
1000	427	.0484	1.307	G
1000	703	.0377	1.320	I
1000	2527	.0201	1.427	H
1000	10101	.010	1.419	K
1000	25193	.0063	1.404	M

Aluminum Tube

Size of Tube IPS	Diameter of Tube (Inches)		Wall Thickness (Inches)
	Outside	Inside	
STANDARD PIPE SIZES			
1/4"	0.540	0.364	0.088
3/8"	0.675	0.493	0.091
1/2"	0.840	0.622	0.109
3/4"	1.050	0.824	0.113
1"	1.315	1.049	0.133
1-1/4"	1.660	1.380	0.140
1-1/2"	1.900	1.610	0.145
2"	2.375	2.067	0.154
2-1/2"	2.875	2.469	0.203
3"	3.500	3.068	0.213
3-1/2"	4.000	3.548	0.226
4"	4.500	4.026	0.237
4-1/2"	5.000	4.506	0.247
5"	5.563	5.047	0.258
6"	6.625	6.065	0.280
EXTRA HEAVY PIPE SIZES			
1/4"	0.540	0.302	0.119
3/8"	0.675	0.423	0.126
1/2"	0.840	0.546	0.147
3/4"	1.050	0.742	0.154
1"	1.315	0.957	0.179
1-1/4"	1.660	1.278	0.191
1-1/2"	1.900	1.500	0.200
2"	2.375	1.939	0.218
2-1/2"	2.875	2.323	0.276
3"	3.500	2.900	0.300
3-1/2"	4.000	3.364	0.318
4"	4.500	3.826	0.337
4-1/2"	5.000	4.290	0.355
5"	5.563	4.813	0.375
6"	6.625	5.761	0.432

Aluminum 1350 Cable Bare - Classes AA and A - Hard Drawn

Cable Code Word	Size (circular mils or AWG)	Copper Equivalent based on equal D.C. resistance, Cu 97% Al 61%	# of Wires	Cable Dia. (inches)	Ultimate Strength (pounds)
Peachbell	6	8	7	0.184	528
Rose	4	6	7	0.232	826
Lily	3	5	7	0.260	1022
Iris	2	4	7	0.292	1266
Pansy	1	3	7	0.328	1537
Poppy	1/0	2	7	0.368	1865
Aster	2/0	1	7	0.414	2350
Phlox	3/0	1/0	7	0.464	2845
Oxlip	4/0	2/0	7	0.522	3590
Daisy	266800	3/0	7	0.586	4525
Laurel	266800	3/0	19	0.593	4800
Tulip	336400	4/0	19	0.666	5940
Canna	397500	250000	19	0.724	6880
Cosmos	477000	300000	19	0.793	8090
Syringa	477000	300000	37	0.795	8600
Dahlia	556500	350000	19	0.856	9440
Mistletoe	556500	350000	37	0.858	9830
Orchid	636000	400000	37	0.918	11240
Violet	715500	450000	37	0.974	12640
Nasturtium	715500	450000	61	0.975	13150
Arbutus	795000	500000	37	1.026	13770
Lilac	795000	500000	61	1.028	14330
Anemone	874500	550000	37	1.077	14830
Crocus	874500	550000	61	1.078	15760
Magnolia	954000	600000	37	1.124	16180
Goldenrod	954000	600000	61	1.126	16860
Bluebell	1033500	650000	37	1.170	17530
Larkspur	1033500	650000	61	1.172	18260
Marigold	1113000	700000	61	1.216	19660
Narcissus	1272000	800000	61	1.300	22000
Carnation	1431000	900000	61	1.379	24300
Coreopsis	1590000	1000000	61	1.454	27000
Dogwood	1590000	1000000	91	1.454	28100

Cable Data

Aluminum 1350 Cable (Bare - Class B)

Size (circular mils or AWG)	Copper Equivalent based on equal D.C. resistance, Cu 97% Al 61%	# of Wires	Cable Dia. (inches)	Ultimate Strength (pounds) Hard Drawn	Minimum Ultimate Strength (pounds) 3/4 Hard	Minimum Ultimate Strength (pounds) Inter Temper
250000	157300	37	0.575	4860	3338	2946
300000	188800	37	0.629	5831	4005	3534
350000	220200	37	0.681	6680	4673	4123
400000	251500	37	0.728	7352	5341	4713
450000	283000	37	0.772	8110	6007	5301
500000	314500	37	0.813	9012	6675	5890
550000	346000	61	0.855	10490	7344	6480
600000	377000	61	0.893	11450	8010	7068
650000	409000	61	0.929	11940	8678	7657
700000	440000	61	0.964	12860	9346	8247
750000	472000	61	0.998	13510	10010	8835
800000	503000	61	1.031	14410	10680	9424
900000	566000	61	1.094	15900	12010	10600
1000000	629000	61	1.152	17670	13350	11780
1100000	692000	91	1.209	20210	14680	12950
1200000	755000	91	1.263	21630	16020	14130
1250000	786000	91	1.289	22530	16690	14720
1300000	818000	91	1.315	23430	17350	15310
1400000	880000	91	1.364	24750	18700	16500
1500000	943000	91	1.412	26500	20020	17670
1600000	1006000	127	1.459	28840	21360	18850
1700000	1069000	127	1.504	30630	22690	20020
1750000	1101000	127	1.526	31530	23350	20610
1800000	1132000	127	1.548	32450	24030	21210
1900000	1195000	127	1.590	33570	25360	22380
2000000	1258000	127	1.632	35340	26700	23560
2500000	1570000	127	1.824	43300	33380	29460
3000000	1890000	169	1.998	53010	40050	35340
3500000	2200000	169	2.158	60610	46730	41230

ACSR

Cable Code Word	Size (circular mils or AWG)	No. Alum Strands	No. Steel Strands	Complete Cable Dia. (inches)	Steel Core Dia. (inches)	Copper Equiv. based on equal D.C. resistance, Cu 97% Al 61%	Ultimate Strength (pounds)
Turkey	6	6	1	0.198	0.0661	8	1170
Thrush	5	6	1	0.223	0.0743	7	1460
Swan	4	6	1	0.250	0.0834	6	1830
Swanate	4	7	1	0.257	0.1029	6	2288
Swallow	3	6	1	0.281	0.0937	5	2250
Sparrow	2	6	1	0.316	0.1052	4	2790
Sparate	2	7	1	0.325	0.1299	4	3525
Robin	1	6	1	0.355	0.1182	3	3480
Raven	1/0	6	1	0.398	0.1327	2	4280
Quail	2/0	6	1	0.447	0.1490	1	5345
Pigeon	3/0	6	1	0.502	0.1672	1/0	6675
Penguin	4/0	6	1	0.563	0.1878	2/0	8420
Waxwing	266800	18	1	0.609	0.1217	3/0	7100
Owl	266800	26	7	0.633	0.2109	3/0	9645
Partridge	266800	26	7	0.642	0.2364	3/0	11250
Ostrich	300000	26	7	0.680	0.2505	188700	12650
Merlin	336400	18	1	0.684	0.1367	4/0	8950
Linnet	336400	26	7	0.721	0.2655	4/0	14050
Oriole	336400	30	7	0.741	0.3177	4/0	17040
Chickadee	397500	18	1	0.743	0.1486	250000	10400
Brant	397500	24	7	0.771	0.2575	250000	14690
Ibis	397500	26	7	0.783	0.2883	250000	16190
Lark	397500	30	7	0.806	0.3453	250000	19980
Pelican	477000	18	1	0.814	0.1628	300000	12300
Flicker	477000	24	7	0.846	0.2820	300000	17200
Hawk	477000	26	7	0.858	0.3162	300000	19430
Hen	477000	30	7	0.883	0.3783	300000	23300
Parakeet	556500	24	7	0.914	0.3045	350000	19850
Dove	556500	26	7	0.927	0.341	350000	22400
Eagle	556500	30	7	0.953	0.409	350000	27200
Peacock	605000	24	7	0.953	0.318	380500	21500
Squab	605000	26	7	0.966	0.356	380500	24100
Teal	605000	30	19	0.994	0.426	380500	30000
Rook	636000	24	7	0.977	0.326	400000	22600
Grosbeak	636000	26	7	0.990	0.365	400000	25000
Egret	636000	30	19	1.019	0.437	400000	31500
Flamingo	666600	24	7	1.000	0.333	419000	23700
Crow	715500	54	7	1.036	0.345	450000	26300
Starling	715500	26	7	1.051	0.387	450000	28100
Redwing	715500	30	19	1.081	0.463	450000	34600
Condor	795000	54	7	1.093	0.364	500000	28500
Drake	795000	26	7	1.108	0.408	500000	31200
Mallard	795000	30	19	1.140	0.489	500000	38400
Crane	874500	54	7	1.146	0.382	550000	31400
Canary	900000	54	7	1.162	0.387	566000	32300
Cardinal	954000	54	7	1.196	0.399	600000	34200
Curlew	1033500	54	7	1.246	0.415	650000	37100
Finch	1113000	54	19	1.293	0.431	700000	40200
Pheasant	1272000	54	19	1.382	0.461	800000	44800
Plover	1431000	54	19	1.465	0.489	900000	50400
Falcon	1590000	54	19	1.545	0.515	1000000	56000

Cable Data

High Strength ACSR

Cable Code Word	Size (circular mils or AWG)	No. Alum Strands	No. Steel Strands	Complete Cable Dia. (inches)	Steel Core Dia. (inches)	Copper Equivalent based on equal D.C. resistance, Cu 97% Al 61%	Ultimate Strength (pounds)
Grouse	80000	8	1	0.367	0.1670	50310	5200
Petrel	101800	12	7	0.461	0.2763	64160	9860
Minorca	110800	12	7	0.481	0.2883	69700	10730
Leghorn	134600	12	7	0.530	0.3177	84600	12920
Guinea	159000	12	7	0.576	0.3453	100000	15200
Dotterel	176900	12	7	0.607	0.3642	111200	16440
Dorking	190800	12	7	0.631	0.3783	120000	17730
Cochin	211300	12	7	0.663	0.3981	132900	19640
Brahma	203200	16	9	0.714	0.4885	127800	27500

Compact Aluminum 1350 Cable (ASTM B400) Extra Hard

Conductor Size		Class	No. of Wires	Cable Dia. (Inches)	Breaking Strength (pounds)
kcmil	AWG				
1000		B	611	1.060	17700
900		B	611	0.999	15900
800		B	611	0.938	14400
750		B	611	0.908	13500
700		B	611	0.877	12900
650		B	611	0.845	11900
600		B	611	0.813	11500
556		AA	193	0.780	9750
550		B	611	0.775	10500
500		B	372	0.736	9110
500		AA	193	0.736	8760
477		AA	193	0.722	8360
450		B	372	0.700	8200
400		B	372	0.659	7440
397		AA, A	193	0.659	7110
350		B	372	0.616	6760
350		A	193	0.616	6390
336		A	193	0.603	6150
336		AA	7	0.603	5960
300		B	372	0.570	5890
300		A	193	0.570	5480
300		AA	7	0.570	5430

Conductor Size		Class	No. of Wires	Cable Dia. (Inches)	Breaking Strength (pounds)
kcmil	AWG				
266		A	193	0.537	4970
266		AA	7	0.537	4830
250		B	372	0.520	4910
250		A	193	0.520	4660
250		AA	7	0.520	4520
	4/0	B	193	0.475	4020
	4/0	AA, A	7	0.475	3830
	3/0	B	193	0.423	3310
	3/0	AA, A	7	0.423	3040
	2/0	B	193	0.376	2670
	2/0	AA, A	7	0.376	2510
	1/0	B	193	0.336	2160
	1/0	AA, A	7	0.336	1990
	1	B	193	0.299	1740
	1	AA, A	7	0.299	1640
	2	AA, A, B	7	0.268	1350
	3	A, B	7	0.238	1090
	4	A, B	7	0.213	.881
	6	A, B	7	0.169	.563
	8	A, B	7	0.134	.312

Aluminum Alloy 5005 Cable (ASTM B397)

Conductor Size cmil	Number of Wires	Approx. Aluminum 1350 Size having Equivalent Resistance		Size & Stranding of ACSR with Equal Diameter			Rated Strength (pounds)
		cmil	AWG	cmil	AWG	Stranding	
927200	37	795000	-	795000	-	26/7	23900
740800	37	636000	-	636000	-	26/7	19300
652400	19	556500	-	556500	-	26/7	16200
587200	19	506500	-	506500	-	18/1	14600
559500	19	477000	-	477000	-	26/7	13900
503600	19	435500	-	435500	-	18/1	12500
465400	19	397500	-	397500	-	26/7	12200
419400	19	362000	-	362000	-	18/1	11200
394500	19	336400	-	336400	-	26/7	10500
355100	19	306400	-	306400	-	18/1	9600
312800	19	266800	-	266800	-	26/7	8450
281400	19	242900	-	242900	-	18/1	7610
246900	7	211600	4/0	211600	4/0	6/1	6330
195700	7	167800	3/0	167800	3/0	6/1	5020
155400	7	133100	2/0	133100	2/0	6/1	4280
123300	7	105600	1/0	105600	1/0	6/1	3440
77470	7	66360	2	66360	2	6/1	2200
48690	7	41740	4	41740	4	6/1	1430
30580	7	26240	6	26240	6	6/1	922

Aluminum Alloy 6201 Cable (ASTM B399)

Conductor Size cmil	Number of Wires	Approx. Aluminum 1350 Size having Equivalent Resistance		Size & Stranding of ACSR with Equal Diameter			Rated Strength (pounds)
		cmil	AWG	cmil	AWG	Stranding	
1439200	61	1272000	-	1272000	-	54/7	46800
1348800	61	1192500	-	1192500	-	54/7	43900
1259600	61	1113000	-	1113000	-	54/7	41000
1165100	61	1033500	-	1033500	-	54/7	37900
1077400	61	954000	-	954000	-	54/7	35000
927200	37	795000	-	795000	-	26/7	30500
740800	37	636000	-	636000	-	26/7	24400
652400	19	556500	-	556500	-	26/7	21900
559500	19	477000	-	477000	-	26/7	18800
465400	19	397500	-	397500	-	26/7	15600
394500	19	336400	-	336400	-	26/7	13300
312800	19	266800	-	266800	-	26/7	11000
246900	7	211600	4/0	211600	4/0	6/1	8560
195700	7	167800	3/0	167800	3/0	6/1	6790
155400	7	133100	2/0	133100	2/0	6/1	5390
123300	7	105600	1/0	105600	1/0	6/1	4460
77470	7	66360	2	66360	2	6/1	2800
48690	7	41740	4	41740	4	6/1	1760
30580	7	26240	6	26240	6	6/1	1110

Cable Data

Aluminum Alloy 8000 Series "O" Temper Cable (ASTM B801)

Conductor Size		Number of Wires [†]	Class	Conductor Diameter (inches)			Min. Breaking Strength (pounds)
kcmil	AWG			Conventional	Compressed	Compact	
1000		127	D	1.153	1.119	1.060	6010
1000		91	C	1.153	1.118	1.060	6010
1000		61	B, A	1.152	1.117	1.060	6010
900		127	D	1.095	1.062	0.999	5400
900		91	C	1.093	1.060	0.999	5400
900		61	B, A	1.093	1.060	0.999	5400
800		127	D	1.032	1.001	0.938	4800
800		91	C	1.032	1.001	0.938	4800
800		61	B, A	1.031	1.000	0.938	4800
750		127	D	0.998	0.968	0.908	4500
750		91	C	0.999	0.969	0.908	4500
750		61	B, A	0.998	0.938	0.908	4500
700		127	D	0.965	0.936	0.877	4200
700		91	C	0.965	0.936	0.877	4200
700		61	B, A	0.964	0.935	0.877	4200
650		127	D	0.930	0.902	0.845	3900
650		91	C	0.930	0.902	0.845	3900
650		61	B	0.929	0.901	0.845	3900
650		37	A	0.928	0.900	0.845	3950
600		127	D	0.893	0.866	0.813	3600
600		91	C	0.893	0.866	0.813	3600
600		61	B	0.893	0.866	0.813	3600
600		37	A	0.891	0.864	0.813	3640
556		127	D	0.861	0.835	0.780	3340
556		91	C	0.860	0.834	0.780	3340
556		61	B	0.860	0.834	0.780	3340
556		37	A	0.858	0.832	0.780	3380
550		127	D	0.855	0.829	0.775	3300
550		91	C	0.855	0.829	0.775	3300
550		61	B	0.855	0.829	0.775	3300
550		37	A	0.853	0.827	0.775	3340
500		91	D	0.815	0.791	0.736	3000
500		61	C	0.815	0.791	0.736	3000
500		37	B, A	0.813	0.789	0.736	3040
477		91	D	0.796	0.772	0.722	2860
477		61	C	0.796	0.772	0.722	2860
477		37	B, A	0.795	0.771	0.722	2900
450		91	D	0.773	0.750	0.700	2700
450		61	C	0.773	0.750	0.700	2700
450		37	B, A	0.772	0.749	0.700	2730
400		91	D	0.729	0.707	0.659	2400
400		61	C	0.729	0.707	0.659	2400
400		37	B, A	0.728	0.706	0.659	2430
397		91	D	0.727	0.705	0.659	2390
397		61	C	0.726	0.704	0.659	2390
397		37	B	0.725	0.703	0.659	2410
397		19	A	0.724	0.702	0.659	2470

Aluminum Alloy 8000 Series "O" Temper Cable (ASTM B801) (Continued)

Conductor Size		Number of Wires [†]	Class	Conductor Diameter (inches)			Min. Breaking Strength (pounds)
kcmil	AWG			Conventional	Compressed	Compact	
350		91	D	0.682	0.661	0.616	2100
350		61	C	0.681	0.661	0.616	2100
350		37	B	0.681	0.661	0.616	2130
350		19	A	0.679	0.659	0.616	2170
336		61	C	0.669	0.649	0.603	2020
336		37	B	0.668	0.648	0.603	2040
336		19	A	0.666	0.646	0.603	2090
300		61	C	0.631	0.612	0.570	1800
300		37	B	0.630	0.611	0.570	1820
300		19	A	0.629	0.610	0.576	1860
266		61	C	0.595	0.577	0.537	1600
266		37	B	0.594	0.576	0.537	1620
266		19	A	0.593	0.575	0.537	1660
250		61	C	0.576	0.559	0.520	1500
250		37	B	0.575	0.558	0.520	1520
250		19	A	0.574	0.557	0.520	1550
4/0		37	C	0.529	0.513	0.475	1280
4/0		19	B	0.528	0.512	0.475	1310
4/0		7	A	0.522	0.506	0.475	1360
3/0		37	C	0.471	0.457	0.423	1020
3/0		19	B	0.470	0.456	0.423	1040
3/0		7	A	0.464	0.450	0.423	1070
2/0		19	B	0.419	0.406	0.376	826
2/0		7	A	0.414	0.402	0.376	853
1/0		19	B	0.373	0.362	0.336	655
1/0		7	A	0.368	0.357	0.336	676
1		19	B	0.332	0.322	0.229	519
2		7	B, A	0.292	0.283	0.268	425
3		7	B, A	0.260	0.252	0.238	337
4		7	B, A	0.232	0.225	0.213	267
6		7	B, A	0.184	0.178	0.169	168
8		7	B, A	0.146	0.142	0.134	106

[†] For compact-stranded constructions, the number of wires may be reduced as follows:

19-Wire Constructions - 18 Wires Minimum

61-Wire Constructions - 58 Wires Minimum

127-Wire Constructions - 122 Wires Minimum

37-Wire Constructions - 35 Wires Minimum

91-Wire Constructions - 87 Wires Minimum

Cable Data

Compact ACSR (ASTM B401)

Conductor Size		Cable Diameter (Inches)	Breaking Strength (pounds)
kcmil	AWG		
336.4		0.628	8260
266.8		0.559	6540
	4/0	0.517	7420
	3/0	0.461	5880
	2/0	0.410	4880
	1/0	0.365	3980
	1	0.326	3290
	2	0.298	3260
	2	0.290	2640
	3	0.258	2130
	4	0.236	2160
	4	0.229	1760
	6	0.182	1120

ACSR/TW (Trap Wire) Cable (ASTM B779)

Conductor Size kcmil	Stranding		Nominal Diameter (inches)	Rated Strength (pounds)
	No. Aluminum Wires	No. Steel Wires		
336.4	14	1	0.63	8600
405.1	14	1	0.68	10200
477.0	18	7	0.78	17200
477.0	18	7	0.79	19400
556.5	18	7	0.84	20000
556.5	20	7	0.85	22600
565.3	20	7	0.86	22900
571.7	18	7	0.85	20600
636.0	27	1	0.85	13500
636.0	18	7	0.89	22900
636.0	20	7	0.91	25400
664.8	20	7	0.93	26600
666.6	20	7	0.91	24000
762.8	20	7	0.99	30500
768.2	20	7	0.98	27700
768.9	27	1	0.93	16400
795.0	17	7	0.96	21000
795.0	18	7	0.98	25900
795.0	20	7	0.99	28200
795.0	20	7	1.01	31800
946.7	35	7	1.08	29600
954.0	30	7	1.05	23700
954.0	32	7	1.06	25900
954.0	20	7	1.08	33500
957.2	32	7	1.06	26000
959.6	22	7	1.11	37000
966.2	21	7	1.09	34000

Conductor Size kcmil	Stranding		Nominal Diameter (inches)	Rated Strength (pounds)
	No. Aluminum Wires	No. Steel Wires		
1033.5	30	7	1.09	25700
1033.5	32	7	1.10	28100
1033.5	21	7	1.13	36300
1113.0	30	7	1.13	27500
1113.0	33	7	1.14	30000
1113.0	38	19	1.19	39100
1158.0	33	7	1.17	31600
1158.4	25	7	1.20	39600
1168.1	30	7	1.16	28900
1192.5	30	7	1.17	29500
1192.5	33	7	1.18	32400
1192.5	38	19	1.22	41900
1233.6	38	19	1.25	42900
1257.1	35	7	1.21	34200
1272.0	30	7	1.20	31400
1272.0	35	7	1.22	34600
1272.0	39	19	1.26	44100
1334.6	39	19	1.29	46300
1351.5	35	7	1.26	36700
1351.4	39	19	1.30	46800
1359.7	36	7	1.26	36900
1372.5	30	7	1.25	33400
1431.0	36	7	1.29	38900
1431.0	39	19	1.34	49600
1433.6	39	19	1.34	49700
1455.3	36	7	1.30	39200
1467.8	33	7	1.29	35800

ACSR/TW (Trap Wire) Cable (ASTMB779) (Continued)

Conductor Size kcmil	Stranding		Nominal Diameter (inches)	Rated Strength (pounds)
	No. Aluminum Wires	No. Steel Wires		
1533.3	39	19	1.38	53200
1557.4	36	7	1.35	41900
1569.0	33	7	1.33	38200
1590.0	36	7	1.36	42200
1590.0	42	19	1.41	55100
1622.0	39	19	1.42	57500
1657.4	36	7	1.39	44000
1730.6	39	19	1.47	59400
1758.6	37	19	1.47	34600
1780.0	37	19	1.45	50700
1926.9	42	19	1.55	65300
1949.6	42	7	1.50	51900
2153.8	64	19	1.60	61100
2156.0	64	19	1.61	61100
2627.3	64	19	1.76	74500

AAC/TW (ALL ALUMINUM TRAP WIRE) (ASTM B778)

Conductor Size kcmil	Nominal Diameter (inches)	Number of Wires	Rated Strength (pounds)
336.4	0.612	17	6220
397.5	0.661	17	7230
477.0	0.720	17	8530
500.0	0.736	17	8940
556.5	0.775	17	9950
600.0	0.803	17	10700
636.0	0.825	17	11400
700.0	0.864	17	12500
750.0	0.893	17	13400
795.0	0.919	17	13900
900.0	0.990	31	15800
954.0	1.018	31	16700
1000.0	1.041	31	17500
1033.5	1.057	31	18100
1113.0	1.095	31	19500
1192.5	1.132	31	20900
1272.0	1.168	31	22300
1351.5	1.202	31	23700
1431.0	1.236	31	24600
1590.0	1.315	49	27300
1750.0	1.377	49	30000
2000.0	1.468	49	34300

Cable Data

ACAR Cable (ASTM B524)

Conductor Size		Number of Wires	Nominal Outside Diameter (inches)
kcmil	AWG		
2000		91	1.630
2000		61	1.630
1900		61	1.588
1800		61	1.546
1750		61	1.525
1700		61	1.502
1600		61	1.458
1500		61	1.411
1400		61	1.364
1300		61	1.314
1300		37	1.312
1250		61	1.288
1250		37	1.287
1200		61	1.263
1200		37	1.261
1100		61	1.209
1100		37	1.207
1000		61	1.152
1000		37	1.151
950		37	1.121
900		37	1.092
850		37	1.061
800		37	1.029
750		37	0.997
700		37	0.962

Conductor Size		Number of Wires	Nominal Outside Diameter (inches)
kcmil	AWG		
650		37	0.928
600		37	0.891
600		19	0.888
550		37	0.853
550		19	0.850
500		37	0.813
500		19	0.811
450		19	0.770
400		19	0.726
350		19	0.678
300		19	0.628
250		19	0.574
246.9		7	0.563
	4/0	7	0.522
195.7		7	0.502
	3/0	7	0.464
155.4		7	0.447
	2/0	7	0.414
123.3		7	0.398
	1/0	7	0.368
77.4		7	0.316
	2	7	0.292
48.6		7	0.250
	4	7	0.232
30.5		7	0.198

SSAC CABLE

Size AWG or kcmil	# Alum Strands	# Steel Strands	Conductor Diameter	Rated Strength (pounds)
266.8	22	7	.622	6030
266.8	24	7	.633	7410
266.8	26	7	.642	8880
266.8	30	7	.660	11700
300.0	26	7	.680	9970
336.4	20	7	.692	5990
336.4	22	7	.701	7610
336.4	24	7	.710	9340
336.4	26	7	.720	11200
336.4	30	7	.741	14800
397.5	20	7	.752	7090
397.5	22	7	.762	8990
397.5	24	7	.772	11000
397.5	26	7	.783	13000
397.5	30	7	.806	17500
477.0	20	7	.823	8490
477.0	22	7	.834	10800
477.0	24	7	.846	13000

Size AWG or kcmil	# Alum Strands	# Steel Strands	Conductor Diameter	Rated Strength (pounds)
477.0	26	7	.858	15600
477.0	30	7	.883	21000
500.0	30	7	.904	22000
556.5	20	7	.890	9910
556.5	22	7	.901	12600
556.5	24	7	.914	15200
556.5	26	7	.927	18200
556.5	30	7	.953	24500
605.0	24	7	.953	16500
605.0	26	7	.966	19700
605.0	30	7	.994	26000
605.0	30	19	.994	26600
636.0	20	7	.951	11300
636.0	22	7	.963	14100
636.0	24	7	.977	17300
636.0	26	7	.990	20700
636.0	30	7	1.019	27400
636.0	30	19	1.019	28000

SSAC Cable (Continued)

Size AWG or kcmil	# Alum Strands	# Steel Strands	Conductor Diameter	Rated Strength (pounds)
666.6	24	7	1.000	18200
666.6	26	7	1.104	21700
715.5	24	7	1.036	19500
715.5	26	7	1.051	23300
715.5	30	19	1.081	30800
795.0	42	7	1.055	11800
795.0	20	7	1.063	14200
795.0	45	7	1.063	14200
795.0	22	7	1.077	17700
795.0	24	7	1.092	21700
795.0	54	7	1.092	21700
795.0	26	7	1.108	25900
795.0	30	19	1.140	34300
900.0	45	7	1.131	15800
900.0	54	7	1.162	24600
954.0	42	7	1.155	14200
954.0	20	7	1.185	16700
954.0	45	7	1.165	16700
954.0	48	7	1.175	19700
954.0	24	7	1.196	26000
954.0	54	7	1.196	26000
954.0	30	19	1.248	41100

Size AWG or kcmil	# Alum Strands	# Steel Strands	Conductor Diameter	Rated Strength (pounds)
1033.5	42	7	1.203	15400
1033.5	45	7	1.212	18100
1033.5	48	7	1.222	21300
1033.5	54	7	1.245	28200
1113.0	42	7	1.248	16300
1113.0	45	7	1.259	19500
1113.0	48	7	1.269	23000
1113.0	54	19	1.293	30400
1192.5	42	7	1.292	17500
1192.5	45	7	1.302	20900
1192.5	48	7	1.313	24600
1192.5	54	19	1.338	32600
1272.0	42	7	1.334	18700
1272.0	45	7	1.345	22300
1272.0	48	7	1.357	26200
1272.0	54	19	1.382	34100
1351.5	42	7	1.376	19900
1351.5	45	7	1.386	23700
1351.5	48	7	1.398	27900
1351.5	54	19	1.424	36200
1431.0	42	7	1.415	21000
1431.0	45	7	1.427	25100
1431.0	48	7	1.439	29500
1431.0	54	19	1.465	38400
1510.5	45	7	1.466	26500
1510.5	54	19	1.505	40500
1590.0	42	7	1.492	23400
1590.0	45	7	1.504	27900
1590.0	48	7	1.517	32200
1590.0	54	19	1.545	42600
1780.0	84	19	1.602	35400
1869.0	68	7	1.603	21500
2034.5	72	7	1.681	27200

Cable Data

Solid COPPERWELD® Cable (ASTM B227)

Conductor Size (AWG)	Nominal Diameter (inches)	Circular Mils	Minimum Breaking Load (pounds)			
			Grade 40 HS	Grade 40 EHS	Grade 30 HS	Grade 30 EHS
4	0.2043	41740	3540	-	3934	4671
5	0.1819	33090	2937	-	3249	3911
-	0.1650*	27230	2779	-	2779	3367
6	0.1620	26240	2679	-	2679	3246
7	0.1443	20820	2207	-	2207	2681
8	0.1285	16510	1816	-	1816	2205
-	0.1280*	16380	1802	-	1802	2188
9	0.1144	13090	1491	-	1491	1790
-	0.1040*	10820	1283	1325	1283	1487
10	0.1019	10380	1231	-	1231	1460
12	0.0808	6530	774	-	774	918
-	0.0800*	6400	759	-	759	900
-	0.0640*	4096	485	-	485	576
18	0.0403	1624	193	-	193	228
-	0.0390*	1521	180	-	180	214
20	0.0320	1024	121	-	121	144

* These diameters are often employed by purchasers for communication lines BUT are not in the American Wire Gauge (B&S Wire Gauge) series, as are the other diameter listed.

Stranded COPPERWELD® Cable (ASTM B228)

Nominal Diameter [†] (inch) Size AWG [‡]	Circular Mils	Diameter* (inch)	Breaking Load (pounds)**		
			High Strength		Extra High Strength
			40% Cond.	30% Cond.	30% Cond.
7/8 (19 No. 5)	628900	.910	50240	55570	66910
13/16 (19 No. 6)	498800	.810	41600	45830	55530
23/32 (19 No. 7)	395500	.721	34390	37740	45850
27/32 (19 No. 8)	313700	.642	28380	31040	37690
9/16 (19 No. 9)	248800	.572	23390	25500	30610
5/8 (7 No. 4)	292200	.613	22310	24780	29430
9/16 (7 No. 5)	231700	.546	18510	20470	24650
1/2 (7 No. 6)	183800	.486	15330	16890	20460
7/16 (7 No. 7)	145700	.433	12670	13910	16890
3/8 (7 No. 8)	115600	.385	10460	11440	13890
11/32 (7 No. 9)	91650	.343	8616	9393	11280
5/16 (7 No. 10)	72680	.306	7121	7758	9196
3 No. 5	99310	.392	8373	9262	11860
3 No. 6	78750	.349	6934	7639	9754
3 No. 7	62450	.311	5732	6291	7922
3 No. 8	49530	.277	4730	5174	6282
3 No. 9	39280	.247	3898	4250	5129
3 No. 10	31150	.220	3221	3509	4160
3 No. 12	19590	.174	2236	-	-

* The designation "inch" is the approximate diameter in proper fraction of an inch.

† The designation AWG is a combination of the number of wires each of the American Wire Gauge size indicated by "No."

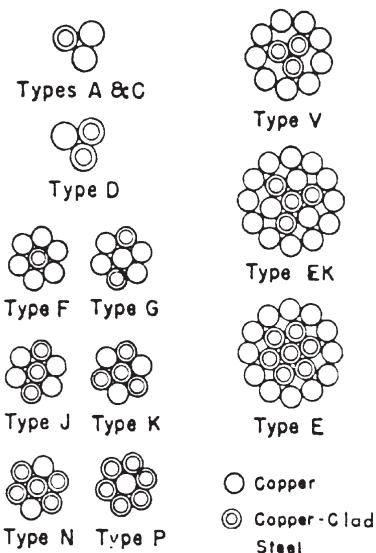
* Diameter of circumscribing.

** Breaking loads of 7-wire and 19-wire conductors are taken as 90% of the sum of the breaking loads of individual wires; breaking load of 3-wire conductors is taken as 95% of the sum of the breaking loads of the individual wires.

COPPERWELD®-COPPER CABLE (ASTM B229)

Conductor size Hard Drawn Copper Equivalent			Nom. Dia. of Conductor (inches)	Min. Breaking Load (pounds)
cmil	AWG	Type		
350000	-	E	0.788	32420
350000	-	EK	0.735	23850
350000	-	V	0.754	23480
300000	-	E	0.729	27770
300000	-	EK	0.680	20960
300000	211600	V	0.698	20730
250000	-	E	0.666	23920
250000	-	EK	0.621	17840
250000	-	V	0.637	17420
	4/0	E	0.613	20730
211600	4/0	G	0.583	15640
211600	4/0	EK	0.571	15370
211600	4/0	V	0.586	15000
211600	4/0	F	0.550	12290
167800	3/0	E	0.545	16800
167800	3/0	J	0.555	16170
167800	3/0	G	0.519	12860
167800	3/0	EK	0.509	12370
167800	3/0	V	0.522	12200
167800	3/0	F	0.490	9980
133100	2/0	K	0.534	17600
133100	2/0	J	0.494	13430
133100	2/0	G	0.463	10510
133100	2/0	V	0.465	9846
133100	2/0	F	0.436	8094
105600	1/0	K	0.475	14490
105600	1/0	J	0.440	10970
105600	1/0	G	0.412	8563
105600	1/0	F	0.388	6536
83690	1	N	0.464	15410
83690	1	K	0.423	11900
83690	1	J	0.392	9000
83690	1	G	0.367	6956
83690	1	F	0.346	5266
66360	2	P	0.462	16870
66360	2	N	0.413	12680
66360	2	K	0.377	9730
66360	2	J	0.349	7322

Conductor size Hard Drawn Copper Equivalent			Nom. Dia. of Conductor (inches)	Min. Breaking Load (pounds)
cmil	AWG	Type		
66360	2	A	0.366	5876
66360	2	G	0.327	5626
66360	2	F	0.308	4233
55620	3	P	0.411	13910
52620	3	N	0.368	10390
52620	3	K	0.336	7910
52620	3	J	0.311	5955
52620	3	A	0.326	4810
41740	4	P	0.366	11420
41740	4	N	0.328	8460
41740	4	D	0.348	7340
41740	4	A	0.290	3938
33090	5	P	0.326	9311
33090	5	D	0.310	6035
33090	5	A	0.258	3193
26240	6	D	0.276	4942
26240	6	A	0.230	2585
26240	6	C	0.225	2143
20820	7	D	0.246	4022
20820	7	A	0.223	2754
16510	8	D	0.219	3256
16510	8	A	0.199	2233
16510	8	C	0.179	1362
11750	9	D	0.174	1743



Cable Data

GALVANIZED STEEL CABLE (ASTM A475)

inches	Nom. Dia. of Strand (mm)	Number of Wires in Strand	Minimum Breaking Load (pounds)				
			Utilities Grade	Common Grade	Siemens-Martin Grade	High-Strength Grade	Extra High-Strength Grade
1/8	3.18	7	-	540	910	1330	1830
5/32	3.97	7	-	870	1470	2140	2940
3/16	4.76	7	-	1150	1900	2850	3990
3/16	4.76	7	2400	-	-	-	-
7/32	5.56	3	-	1400	2340	3500	4900
7/32	5.56	7	-	1540	2560	3850	5400
1/4	6.35	3	3150	1860	3040	4730	6740
1/4	6.35	3	4500	-	-	-	-
1/4	6.35	7	-	1900	3150	4750	6650
9/32	7.14	3	-	2080	3380	5260	7500
9/32	7.14	7	4600	2570	4250	6400	8950
5/16	7.94	3	6500	2490	4090	6350	9100
5/16	7.94	7	-	3200	5350	8000	11200
5/16	7.94	7	6000	-	-	-	-
3/8	9.52	3	8500	3330	5560	8360	11800
3/8	9.52	7	11500	4250	6950	10800	15400
7/16	11.11	7	18000	5700	9350	14500	20800
1/2	12.70	7	25000	7400	12100	18800	26900
1/2	12.70	19	-	7620	12700	19100	26700
9/16	14.29	7	-	9600	15700	24500	35000
9/16	14.29	19	-	9640	16100	24100	33700
5/8	15.88	7	-	11600	19100	29600	42400
5/8	15.88	19	-	11000	18100	28100	40200
3/4	19.05	19	-	16000	26200	40800	58300
7/8	22.22	19	-	21900	35900	55800	79700
1	25.40	9	-	28700	47000	73200	104500
1	25.40	37	-	28300	46200	71900	102700
1-1/8	28.58	37	-	36000	58900	91600	130800
1-1/4	31.75	37	-	44600	73000	113600	162200

Cable Data / Terminal Stud Size Reference and Chart

ALUMINUM-COATED STEEL CABLE (ASTM A474)

Nom. Dia. of Strand (inches)	Number of Wires in Strand	Minimum Breaking Strength (pounds)				
		Utilities Grade*	Common Grade	Siemens-Martin Grade	High-Strength Grade	Extra High-Strength Grade
3/16	7		1150	1900	2850	
3/16	7	2400				
1/4	3	3150				
1/4	3	4500				
1/4	7		1900	3150	4750	6650
9/32	7	4600				
5/16	3	6500				
5/16	7		3200	5350	8000	11200
5/16	7	6000				
3/8	3	8500				
3/8	7	11500	4250	6950	10800	15400
7/16	7	18000	5350	9350	14500	20800
1/2	7	25000	7400	12100	18800	26900

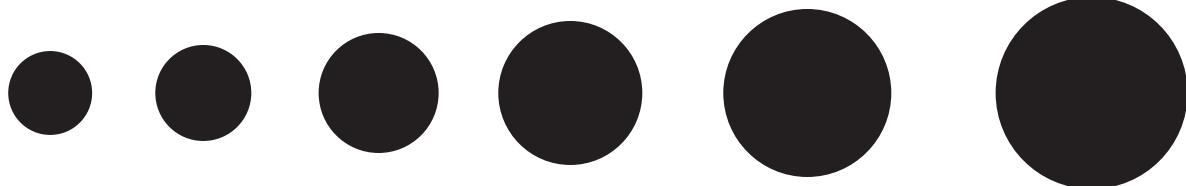
* The Utilities Grade is used principally by communications and power and light industries.

TERMINAL STUD SIZE CHART*

Stud Size	#0	#1	#2	#3	#4	#5	#6	#8	#10	#12	#14	1/4"	5/16"	3/8"
Stud Dia.	.060	.073	.086	.090	.112	.125	.138	.164	.190	.216	.242	.250	.312	.375



Stud Size	7/16"	1/2"	5/8"	3/4"	7/8"	1"
Stud Dia	.437	.500	.625	.750	.875	1.000



*Tolerance .003" on decimal .005" on fractional dimensions

Cable Data - AWG vs. Metric Wire Sizes

Circ. Mils	Equivalent Circ. Mils	AWG Size	Metric Wire Size (mm)	Number of Strands	Wire Dia. per Strand		Approx. Overall Diameter	
					inches	mm	inches	mm
-	937	-	.50	1	.032	.813	.032	.81
1020	-	20	-	7	.0121	.307	.036	.91
-	1480	-	.75	1	.039	.991	.039	.99
1620	-	18	-	1	.0103	1.02	.040	1.02
1620	-	18	-	7	.0152	.386	.046	1.16
-	1974	-	1.0	1	.045	1.14	.045	1.14
-	1974	-	1.0	7	.017	.422	.061	1.30
2580	-	16	-	1	.0503	1.29	.051	1.29
2580	-	16	-	7	.0192	.468	.058	1.46
-	2960	-	1.5	1	.055	1.40	.055	1.40
-	2960	-	1.5	7	.021	5.33	.063	1.60
4110	-	14	-	1	.0641	1.63	.064	1.63
4110	-	14	-	7	.0242	.615	.073	1.84
-	4934	-	2.5	1	.071	1.80	.071	1.80
-	4934	-	2.5	7	.027	6.66	.081	2.06
6530	-	12	-	1	.0308	2.05	.081	2.05
6530	-	12	-	7	.0305	.775	.092	2.32
-	7894	-	4	1	.089	2.26	.089	2.26
-	7894	-	4	7	.034	.864	.102	2.59
10380	-	10	-	1	.1019	2.59	.102	2.59
10380	-	10	-	7	.0355	.978	.116	2.93
-	11840	-	6	1	.109	2.77	.109	2.77
-	11840	-	6	7	.042	.107	.126	3.21
13000	-	9	-	1	.1144	2.91	.114	2.91
13090	-	9	-	7	.0432	1.10	.130	3.30
16510	-	8	-	1	.1285	3.26	.128	3.25
16510	-	8	-	7	.0486	1.23	.146	3.70
-	19740	-	10	1	.141	3.58	.141	3.58
-	19740	-	10	7	.054	1.37	.162	4.12
20520	-	7	-	1	.1443	3.67	.144	3.67
20520	-	7	-	7	.0545	1.38	.164	4.15
26240	-	6	-	1	.162	4.11	.162	4.11
26240	-	6	-	7	.0612	1.55	.184	4.66
-	31580	-	16	7	.008	1.73	.204	5.13
33090	-	5	-	7	.0688	1.75	.206	5.24
41740	-	4	-	7	.0772	1.96	.232	5.88
-	49340	-	25	7	.085	2.16	.255	6.48
-	49340	-	25	19	.052	1.32	.260	6.60
52620	-	3	-	7	.0867	2.20	.260	6.61
66300	-	2	-	7	.0974	2.47	.292	7.42

Cable Data - AWG vs. Metric Wire Sizes**AWG VS. METRIC WIRE SIZES (continued)**

Circ. Mils	Equivalent Circ. Mil	AWG Size	Metric Wire Size (mm)	Number of Strands	Wire Dia. per Strand		Approx. Overall Diameter	
					inches	mm	inches	mm
-	69070	-	35	7	.100	2.54	.300	7.62
-	69070	-	35	19	.001	1.55	.305	7.75
83690	-	1	-	19	.0064	1.50	.332	8.43
-	98680	-	50	19	.073	1.85	.365	9.27
105000	-	1/0	-	19	.0745	1.59	.373	9.46
133100	-	2/0	-	19	.0837	2.13	.419	10.6
-	138100	-	70	19	.086	2.18	.430	10.9
167800	-	3/0	-	19	.094	2.59	.470	11.9
167800	-	3/0	-	36	.0673	1.71	.471	12.0
-	187500	-	95	19	.101	2.57	.505	12.8
-	187500	-	95	37	.072	1.83	.504	12.5
211600	-	4/0	-	19	.1055	2.89	.528	13.4
-	237.8 kcmil	-	120	37	.081	2.06	.567	14.4
250 kcmil	-	-	-	37	.0822	2.07	.575	14.6
300 kcmil	-	-	150	37	.090	2.29	.630	16.0
350 kcmil	-	-	-	37	.0973	2.47	.681	17.3
-	365.1 kcmil	-	185	37	.100	2.54	.700	17.8
400 kcmil	-	-	-	37	.104	2.64	.728	18.5
-	473.6 kcmil	-	240	37	.114	2.90	.798	20.3
-	473.6 kcmil	-	240	61	.089	2.26	.801	20.3
500 kcmil	-	-	-	37	.1162	2.95	.813	20.7
500 kcmil	-	-	-	61	.0905	2.30	.814	20.7
-	592.1 kcmil	-	300	61	.099	2.51	.891	22.6
600 kcmil	-	-	-	61	.0992	2.52	.893	22.7
700 kcmil	-	-	-	61	.1071	2.72	.964	24.5
750 kcmil	-	-	-	6	.1109	2.82	.998	25.4
750 kcmil	-	-	-	91	.0908	2.31	.998	25.4
-	789.4 kcmil	-	400	61	.114	2.90	1.026	26.1
800 kcmil	-	-	-	61	.1145	2.91	1.031	26.2
800 kcmil	-	-	-	91	.0958	2.38	1.032	26.2
1000 kcmil	986.8 kcmil	-	500	61	.1280	3.25	1.152	28.3
1000 kcmil	-	-	-	91	.1048	2.66	1.153	29.3
-	1233.7 kcmil	-	625	91	.117	2.97	1.287	32.7
1250 kcmil	-	-	-	91	.1172	2.93	1.289	32.7
1250 kcmil	-	-	-	127	.0992	2.52	1.200	32.8
1500 kcmil	-	-	-	91	.1284	3.26	1.412	36.9
1500 kcmil	-	-	-	127	.1087	2.76	1.413	36.9
-	1578.8 kcmil	-	800	91	.132	3.35	1.452	36.9
-	1973.5 kcmil	-	1000	91	.147	3.73	1.617	41.1
2000 kcmil	-	-	-	127	.1255	3.19	1.632	41.5
2000 kcmil	-	-	-	169	.1088	2.76	1.632	41.5

Reference - Inches & Millimeters Conversion Chart

INCHES & MILLIMETERS CONVERSION CHART

INCHES	MM	INCHES	MM	MM	INCHES	MM	INCHES
$\frac{1}{64}$	.015625	—	0.397	$\frac{33}{64}$	.515625	—	13.097
$\frac{1}{32}$	.03125	—	0.794	$\frac{17}{32}$	.53125	—	13.494
$\frac{3}{64}$	.046875	—	1.191	$\frac{35}{64}$	.546875	—	13.891
$\frac{1}{16}$	.0625	—	1.588	$\frac{9}{16}$	.5625	—	14.288
$\frac{5}{64}$	.078125	—	1.984	$\frac{37}{64}$	.578125	—	14.684
$\frac{3}{32}$	.09375	—	2.381	$\frac{19}{32}$	.59375	—	15.081
$\frac{7}{64}$	.109375	—	2.778	$\frac{39}{64}$	.609375	—	15.478
$\frac{1}{8}$	.1250	—	3.175	$\frac{5}{8}$	.6250	—	15.875
$\frac{9}{64}$	.140625	—	3.572	$\frac{41}{64}$	.640625	—	16.272
$\frac{5}{32}$	.15625	—	3.969	$\frac{21}{32}$	.65625	—	16.669
$\frac{11}{64}$	.171875	—	4.366	$\frac{43}{64}$	.671875	—	17.066
$\frac{3}{16}$	.1875	—	4.763	$\frac{11}{16}$	.6875	—	17.463
$\frac{13}{64}$	.203125	—	5.159	$\frac{45}{64}$	.703125	—	17.859
$\frac{7}{32}$	.21875	—	5.556	$\frac{23}{32}$	.71875	—	18.256
$\frac{15}{64}$	.234375	—	5.953	$\frac{47}{64}$	.734375	—	18.653
$\frac{1}{4}$	.2500	—	6.350	$\frac{3}{4}$	.7500	—	19.050
$\frac{17}{64}$	.265625	—	6.747	$\frac{49}{64}$	.765625	—	19.447
$\frac{9}{32}$	.28125	—	7.144	$\frac{25}{32}$	.78125	—	19.844
$\frac{19}{64}$	.296875	—	7.541	$\frac{51}{64}$	.796875	—	20.241
$\frac{5}{16}$	.3125	—	7.938	$\frac{13}{16}$	.8125	—	20.638
$\frac{21}{64}$	.328125	—	8.334	$\frac{53}{64}$	.828125	—	21.034
$\frac{11}{32}$	.34375	—	8.731	$\frac{27}{32}$	.84375	—	21.431
$\frac{23}{64}$	.359375	—	9.128	$\frac{55}{64}$	.859375	—	21.828
$\frac{3}{8}$	.3750	—	9.525	$\frac{7}{8}$	.8750	—	22.225
$\frac{25}{64}$	.390625	—	9.922	$\frac{57}{64}$	.890625	—	22.622
$\frac{13}{32}$	.40625	—	10.319	$\frac{29}{32}$	.90625	—	23.019
$\frac{27}{64}$	.421875	—	10.716	$\frac{59}{64}$	.921875	—	23.416
$\frac{7}{16}$	.4375	—	11.113	$\frac{15}{16}$	.9375	—	23.813
$\frac{29}{64}$	.453125	—	11.509	$\frac{61}{64}$	.953125	—	24.209
$\frac{15}{32}$	.46875	—	11.906	$\frac{31}{32}$	.96875	—	24.606
$\frac{31}{64}$	.484375	—	12.303	$\frac{63}{64}$	.984375	—	25.003
$\frac{1}{2}$	.5000	—	12.700	1	1.000	—	25.400

BURNDY Conductor Numbering System

BURNDY CONDUCTOR NUMBERING SYSTEM - © BURNDY ENGINEERING CO., INC., 1940

Outside Dia. IN	Outside Dia. MM	STR. CABLE		SOL. WIRE		AREA MM2 Copper Cable	ACSR		PIPE SIZE CONDUCTOR				TUBE & ROD		SERVIT NO.
		Cat. No.	Size	Cat. No.	Size		Cat. No.	Cable Size	Cat. No.	ST D	Cat No.	Ex Hvy	Cat. No.	Dia.	
.102	2.594			10W	10	5.261									KS90
.114	2.896			9W	9	6.634									
.116	2.946	10 C	10			5.261									
.125	3.175												60	1/8	
.129	3.277			8W	8	8.366									KS15
.130	3.302	9 C	9			6.634									
.144	3.658			7W	7	10.550									
.146	3.708	8 C	8			8.366									
.158	4.013						8R	8							
.162	4.115			6W	6	13.300									KS17
.164	4.166	7 C	7			10.550									
.176	4.470							7R	7						
.182	4.597			5W	5	16.770									
.184	4.648	6 C	6			13.300									
.198	5.029							6R	6						
.204	5.182			4W	4	21.150									KS20
.206	5.258	5 C	5			16.770									
.223	5.664							5R	5						
.229	5.817			3W	3	26.670									
.232	5.867	4 C	4			21.150									
.250	6.350							4R	4				61	1/4	
.258	6.553			2W	2	33.630									KS22
.260	6.629	3 C	3			2.6670									
.281	7.137							3R	3						
.289	7.344			1W	1	42.410									
.292	7.394	2 C	2			33.630									KS23
.316	8.026							2R	2						
.325	8.255			75	1/0	53.480									
.332	8.382	1 C	1			42.410									
.355	9.017							1R	1						
.365	9.274			76	2/0	67.430									
.372	9.474	25	1/0			53.480									KS25
.375	9.525												62	3/8	
.398	10.109							25R	1/0						
.405	10.287									10	1/8	50	1/8		
.410	10.414			77	3/0	85.030									
.419	10.617	26	2/0			67.430									KS26
.447	11.354							26R	2/0						
.460	11.684			78	4/0	107.200									
.470	11.938	27	3/0			85.030									
.500	12.700												63	1/2	
.502	12.725							27R	3/0						
.528	13.414	28	4/0			107.200									KS28
.540	13.716										11	1/4	51	1/4	
.563	14.326							28R	4/0						
.575	14.605	29	250			127.000									
.630	16.002	30	300			152.000									
.633	16.078							29R	266.800						
.642	16.307							30R	266.800						
.675	17.145									12	3/8	52	3/8		
.680	17.272							31R	300,000						
.681	17.297	31	350			177.000									KS31
.721	18.313							32R	336.400						
.728	18.494	32	400			203.000									
.741	18.824							33R	336.400						
.750	19.050												64	3/4	
.772	19.609	33	450			228.000									
.783	19.888							34R	397.500						
.806	20.472							35R	397.500						
.813	20.676	34	500			253.000									
.840	21.336									13	1/2	53	1/2		
.855	21.717	35	550			279.000									KS34
.858	21.742							36R	477.000						
.883	22.428							37R	477.000						
.893	22.682	36	600			304.000									
.904	22.962							38R	500.000						
.927	23.546							39R	556.500						
.929	23.597	37	650			329.000									
.953	24.206							40R	556.500						
.953	24.206							41R	605.000						
.964	24.486	38	700			355.000									
.977	24.714							42R	636.000						
.998	25.349	39	750			380.000									KS39
1.000	25.400							43R	666.600				65	1	

BURNDY Conductor Numbering System

BURNDY CONDUCTOR NUMBERING SYSTEM (continued)

Outside Dia. IN	Outside Dia. MM	STR. CABLE		SOL. WIRE		AREA MM2 Copper Cable	ACSR		PIPE SIZE CONDUCTOR				TUBE & ROD		SERVIT NO.
		Cat. No.	Size	Cat. No.	Size		Cat. No.	Cable Size	Cat. No.	ST D	Cat No.	Ex Hvy	Cat. No.	Dia.	
1.051	20.187	40	800			405.000									
1.036	26.314						44R	715.500							
1.050	26.670								14		54				
1.062	26.975	41	850			431.000									
1.094	27.762	42	900			456.000	45R	795.000							
1.123	28.524	43	950			481.000									
1.146	29.108						46R	874.000							
1.152	29.264	44	1000			507.000									KS44
1.162	29.515						47R	900.000							
1.196	30.378						48R	954.000							
1.209	30.709	444	1100			557.000									
1.246	31.648						49R	1,033.500							
1.250	31.750												66	1	
1.263	32.080	448	1200			608.000									
1.289	32.744	45	1250			633.000									
1.293	32.817						50R	1,113.000							
1.315	33.404	452	1300						15	1	55	1			
1.338	33.960						51R	1,192.500							
1.364	34.646	456	1400			709.000									
1.382	35.103						52R	1,272.000							
1.412	35.865	46	1500			760.000									
1.424	36.170						53R	1,351.500							
1.459	37.059	464	1600			811.000									
1.465	37.214						54R	1,431.000							
1.500	38.100												67	1-1/2	
1.504	38.202	468	1700			861.000									
1.506	38.252						55R	1,510.500							
1.526	38.786	47	1750			866.000									
1.545	39.218						56R	1,590.000							
1.548	39.319	472	1800			912.000									
1.590	40.386	476	1900			963.000									
1.632	41.427	48	2000			1013.00									
1.660	42.164								16	1	56	1			
1.729	43.917	483	2250			1140.000									
1.824	46.330	486	2500			1267.000									
1.900	48.260								17	1-1/2	57	1-1/2			
1.914	48.616	490	2750			1393.000									
1.988	50.495	493	3000			1520.000									
2.000	50.800												68	2	
2.375	60.325								18	2	58	2			
2.500	63.500												69	2-1/2	
2.875	73.025								19	2-1/2	59	2-1/2			
3.000	76.200												70	3	
3.500	88.900								20	3	90	3	71	3-1/2	
4.000	101.600								21	3-1/2	91	3-1/2	72	4	
4.500	114.300								22	4	92	4	73	4-1/2	
5.000	127.000								23	4-1/2	93	4-1/2	74	5	
5.563	141.300								24	5	94	5			
6.063	154.000								85	5-1/2	95	5-1/2			
6.625	168.275								86	6	96	6			
7.625	193.675								87	7	97	7			
8.625	219.075								88	8	98	8			

DIE INDEX REFERENCE

This chart provides a cross reference between die index numbers marked on **BURNDY® Compression Connectors** and corresponding **BURNDY® Die Sets** used with the various **BURNDY® Installation Tools**.

This is the only way to have complete connections with **The BURNDY® Engineered System**.

A die index number has been assigned to each required groove configuration. A prefix letter is used to indicate the specific installation tool for which the die has been designed, as shown.

DIE PROFILES

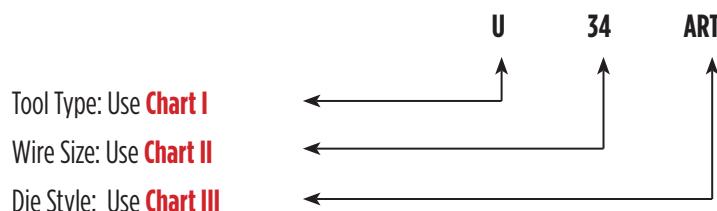
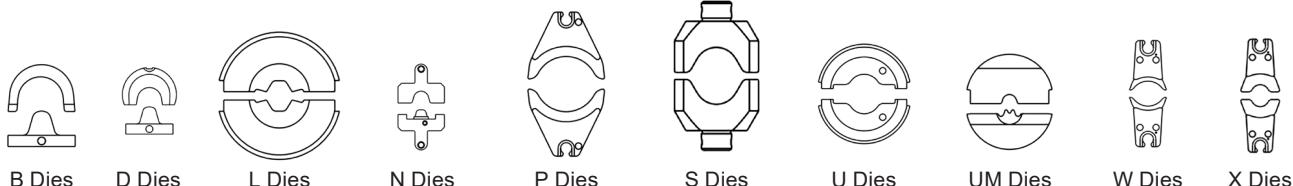


CHART I - Tool Type

B = Y34BH	U = 35 and 750 Series, 46 Series w/PUADP1
D = Y29BH	U-die Adapter
L = 60 Series	UM = OEM840NCP, 750 Series, 46 Series w/PUADP1
N = M8ND	U-die Adapter
P = 46 Series	W = MD and PATMD Series, PAT500SJ, PAT600
S = Y45	X = MD6 and MD7 Series

CHART II - Wire Size

12 = #12 AWG	27 = 3/0
10 = #10 AWG	28 = 4/0
8C = #8 AWG	29 = 250 kcmil
6C = #6 AWG	30 = 300 kcmil
5C = #5 AWG	31 = 350 kcmil
4C = #4 AWG	32 = 400 kcmil
3C = #3 AWG	34 = 500 kcmil
2C = #2 AWG	36 = 600 kcmil
1C = #1 AWG	39 = 750 kcmil
25 = 1/0	44 = 1000 kcmil
26 = 2/0	

Or INDEX NUMBER: Example U312 = **312** Die Index

CHART III - Die Style

A = Aluminum
R = Round (circumferential)
T = Twin Die (both halves)

Footnotes for the chart in the following pages:

- ① - Cat. No. Y35P3 Adapter is required to use "Y34PR" type indenters with "U" type nest dies in 35 and 750 Series
- ② - Cat. No. PT6515 Adapter is required to use "U" type dies in Y45
- ③ - Cat. No. PUADP1 Adapter is required to use "U" type dies in 46 Series
- ④ - These sizes (250 - 500 kcmil) are not recommended for use with MD6 & MD7 Series tools due to high handle force
- ⑤ - Hexagonal crimp
- ⑥ - Die 302 recommended for 1.84 O.D. barrel
- - Index 302 Dieless: can only be crimped with the 444S series, Y644MBH or Y644MBHF

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES					
GROOVE						35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series	
BURNDY	EEI	TYPE	COLOR	MR, MY	444S / 644 Series	MD / PATMD Series	Y29BH				
A		DIE SET						UA	UA	UA	UA
BG		DIE SET				Perm. GR WBG		UBG	UBG	UBG	UBG
C		DIE SET	BROWN			WC		UC	UC	UC	UC
D		DIE SET						UD	UD	UD	UD
D3		DIE SET	BLUE					UYFD	UYFD	UYFD	UYFD
						Perm. GR		UD3	UD3	UD3	UD3
E		DIE SET						UE	UE	UE	UE
F		DIE SET						UF	UF	UF	UF
H		DIE SET						UH	UH	UH	UH
K1/4		DIE SET			WK14						
K5/16		DIE SET			WK516		UK516T	UK516T	UK516T	UK516T	
K3/8		DIE SET			WK38		UK38T	UK38T	UK38T	UK38T	
K1/2		DIE SET			WK12						
K9/16		DIE SET			WK916		UK916T	UK916T	UK916T	UK916T	
K19/32		DIE SET			WK1932						
K5/81		DIE SET					UK581T	UK581T	UK581T	UK581T	
K11/16		DIE SET			WK1116		UK1116T	UK1116T	UK1116T	UK1116T	
K3/4		DIE SET					UK34T	UK34T	UK34T	UK34T	
K1		DIE SET					UK1T	UK1T	UK1T	UK1T	
K15/16		DIE SET					UK1516T	UK1516T	UK1516T	UK1516T	
K635		DIE SET			WK737		UK737T	UK737T	UK737T	UK737T	
K747		DIE SET			WK747						
K781		DIE SET			WK781						
K840		DIE SET			WK840		UK840T	UK840T	UK840T	UK840T	
KB		DIE SET			WKB		UKBT	UKBT	UKBT	UKBT	
KBKT		DIE SET					UKBKT	UKBKT	UKBKT	UKBKT	
KC		DIE SET					UKCT	UKCT	UKCT	UKCT	
KK		DIE SET			WKK						
KR		DIE SET	YELLOW							PYFR	
										SKR	PKR
KT		DIE SET				WKT					
KU		DIE SET					UKUT	UKUT	UKUT	UKUT	
L		DIE SET			WL		UL	UL	UL	UL	
L80		DIE SET					U32XRT	U32XRT	U32XRT	U32XRT	
L99		DIE SET	PINK				U38XRT	U38XRT	U38XRT	U38XRT	
L115		DIE SET	YELLOW				U44XRT	U44XRT	U44XRT	U44XRT	
M		DIE SET					UM	UM	UM	UM	
N		DIE SET	RED				UYFN	UYFN	UYFN	UYFN	
							UN	UN	UN	UN	

See Footnotes at the beginning of chart

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES							
GROOVE		TYPE	COLOR	MR, MY	444S / 644 Series	MD / PATMD Series	Y29BH	35 ① Series	750 ① Series	Y45 ②	46 ③ Series	60 Series	
BURNDY	EEI												
0		DIE SET	GREEN					UYFO	UYFO	UYFO	UYFO	UYFO	
						Perm. GR W0		UO	UO	UO	UO	UO	
Q		DIE SET				WQ							
R		DIE SET						UR	UR	UR	UR	UR	
T		DIE SET								ST			
Z		DIE SET								SZ			
7 94		DIE SET	BLUE	MR4C MY293 MY2911	1 CRIMP	W5CRT		U5CRT	U5CRT	U5CRT	U5CRT	U5CRT	
		NEST				D6CL	U6CD1	U6CD1	U6CD1	U6CD1	U6CD1	U6CD1	
		INDENTOR				Y29PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
8 95		DIE SET	GRAY	MR4C MY293 MY2911	1 CRIMP	W4CRT		U4CRT	U4CRT	U4CRT	U4CRT	U4CRT	
		NEST				D4CL	U4CD1	U4CD1	U4CD1	U4CD1	U4CD1	U4CD1	
		INDENTOR				Y29PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
9 96		DIE SET	WHITE	MY293 MY2911	1 CRIMP	W3CRT		U3CRT	U3CRT	U3CRT	U3CRT	U3CRT	
		NEST				D3CL	U3CD1	U3CD1	U3CD1	U3CD1	U3CD1	U3CD1	
		INDENTOR				Y29PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
10 97		DIE SET	BROWN	MY293 MY2911	1 CRIMP	W2CRT		U2CRT	U2CRT	U2CRT	U2CRT	U2CRT	
		NEST				D2CL	U2CD1	U2CD1	U2CD1	U2CD1	U2CD1	U2CD1	
		INDENTOR				Y29PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
11 98		DIE SET	GREEN	MY293 MY2911	1 CRIMP	WICRT1		U1CRT1	U1CRT1	U1CRT1	U1CRT1	U1CRT1	
		NEST				D1CL	U1CD1	U1CD1	U1CD1	U1CD1	U1CD1	U1CD1	
		INDENTOR				Y29PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
12 99		DIE SET	PINK	MY293 MY2911	1 CRIMP	W25RT		U25RT	U25RT	U25RT	U25RT	U25RT	
		NEST				D25L	U25D1	U25D1	U25D1	U25D1	U25D1	U25D1	
		INDENTOR				Y29PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
13 100		DIE SET	BLACK	MY293 MY2911	1 CRIMP	W26RT		U26RT	U26RT	U26RT	U26RT	U26RT	
		NEST				D26L	U26D1	U26D1	U26D1	U26D1	U26D1	U26D1	
		INDENTOR				Y29PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
14 101		DIE SET	ORANGE	MY293 MY2911	1 CRIMP	W27RT		U27RT	U27RT	U27RT	U27RT	U27RT	
		NEST				D27L	U27D1	U27D1	U27D1	U27D1	U27D1	U27D1	
		INDENTOR				Y29PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
15		DIE SET	PURPLE	MY293 MY2911	1 CRIMP	W28RT		U28RT	U28RT	U28RT	U28RT	U28RT	
		NEST				D28L	U28D1	U28D1	U28D1	U28D1	U28D1	U28D1	
		INDENTOR				Y29PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
16		DIE SET	YELLOW	MY293 MY2911	1 CRIMP	W29RT ④		U29RT	U29RT	U29RT	U29RT	U29RT	
		NEST				D29L		U29D1	U29D1	U29D1	U29D1	U29D1	
		INDENTOR				Y29PR		Y34PR	Y34PR	Y34PR	Y34PR	Y34PR	
17		DIE SET	WHITE		1 CRIMP	W30RT ④		U30RT	U30RT	U30RT	U30RT	L30RT	
		NEST						U30D1	U30D1	U30D1	U30D1	U30D1	
		INDENTOR						Y34PR	Y34PR	Y34PR	Y34PR		

See Footnotes at the beginning of chart

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES						
GROOVE	EEI	TYPE	COLOR	MR, MY	444S / 644 Series	MD / PATMD Series	Y29BH	35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series
18		DIE SET	RED		1 CRIMP	W31RT ④		U31RT	U31RT	U31RT	U31RT	L31RT
		NEST						U31D1	U31D1	U31D1	U31D1	
		INDENTOR						Y34PR	Y34PR	Y34PR	Y34PR	
19		DIE SET	BLUE		1 CRIMP	W32RT ④		U32RT	U32RT	U32RT	U32RT	L32RT
		NEST						U32D1	U32D1	U32D1	U32D1	
		INDENTOR						Y34PR	Y34PR	Y34PR	Y34PR	
20		DIE SET	BROWN		1 CRIMP	W34RT ④		U34RT	U34RT	U34RT	U34RT	L34RT
		NEST						U34D1	U34D1	U34D1	U34D1	
		INDENTOR						Y34PR	Y34PR	Y34PR	Y34PR	
21		DIE SET	YELLOW		1 CRIMP			U35RT	U35RT	U35RT	U35RT	
		NEST										
		INDENTOR										
22		DIE SET	GREEN		1 CRIMP			U36RT	U36RT	U36RT	U36RT	L36RT
		NEST								P36D		
		INDENTOR								P44PR		
23		DIE SET	ORANGE		1 CRIMP			U37RT	U37RT	U37RT	U37RT	
		NEST										
		INDENTOR										
24		DIE SET	BLACK		1 CRIMP			U39RT	S39RT	P39RT	L39RT	
		NEST								P39D		
		INDENTOR								P44PR		
25		DIE SET	ORANGE		1 CRIMP				S40RT	P40RT		
		NEST								P40D		
		INDENTOR								P44PR		
26		DIE SET	GOLD		1 CRIMP							
		NEST										
		INDENTOR										
27		DIE SET	WHITE		1 CRIMP				S44RT	P44RT	L44RT	
		NEST								P44D		
		INDENTOR								P44PR		
29		DIE SET	YELLOW							P45RT	L45RT	
		NEST										
		INDENTOR										
30		DIE SET	ORANGE									
		NEST										
		INDENTOR										
31		DIE SET	GREEN						S46RT	P46RT	L46RT	
		NEST								No Nest		
		INDENTOR								P44PR		

See Footnotes at the beginning of chart

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES								
GROOVE						MR, MY	444S / 644 Series	MD / PATMD Series	Y29BH	35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series
BURNDY	EEI	Type	Color											
33		DIE SET	GRAY										L47RT	
		NEST												
		INDENTOR												
34		DIE SET	BROWN										L48RT	
		NEST												
		INDENTOR												
38		NEST		MR4C MR8G98 MR89Q MY28 Y8MRB1				DV8L	UV8L	UV8L	UV8L	UV8L		
		INDENTOR						Y29PL	Y34PL	Y34PL	Y34PL	Y34PL		
39		NEST		MR4C MY28	1 CRIMP			DV6L	UV6L	UV6L	UV6L	UV6L		
		INDENTOR						Y29PL	Y34PLA	Y34PLA	Y34PLA	Y34PLA		
40		NEST		MR4C MY28				DV4L	UV4L	UV4L	UV4L	UV4L		
		INDENTOR						Y29PL	Y34PLA	Y34PLA	Y34PLA	Y34PLA		
41		NEST		MY28				DV2L	UV2L	UV2L	UV2L	UV2L		
		INDENTOR						Y29PL	Y34PLA	Y34PLA	Y34PLA	Y34PLA		
42		NEST		MY28				DV1L	UV1L	UV1L	UV1L	UV1L		
		INDENTOR						Y29PL	Y34PLA	Y34PLA	Y34PLA	Y34PLA		
43		NEST		MY28				DV25L	UV25L	UV25L	UV25L	UV25L		
		INDENTOR						Y29PL	Y34PA	Y34PA	Y34PA	Y34PA		
44		NEST		MY28				DV26L	UV26L	UV26L	UV26L	UV26L		
		INDENTOR						Y29PL	Y34PA	Y34PA	Y34PA	Y34PA		
45		NEST		MY28					UV27L	UV27L	UV27L	UV27L		
		INDENTOR							Y34PA	Y34PA	Y34PA	Y34PA		
46		NEST		MY28					UV28L	UV28L	UV28L	UV28L		
		INDENTOR							Y34PA	Y34PA	Y34PA	Y34PA		
49		DIE SET	RED				W8CRT		U8CRT	U8CRT	U8CRT	U8CRT		
161		DIE SET					W161		U161	U161	U161	U161		
162		DIE SET					W162		U162	U162	U162	U162		
163 505		DIE SET					W163		U163	U163	U163	U163		
164 275		DIE SET					W164		U164	U164	U164	U164		
165 205 287 339		DIE SET					W165		U165/U205	U165/U205	U165/U205	U165/U205	L165	
166 206 459		DIE SET					W166		U166/U459	U166/U459	U166/U459	U166/U459	L166	
167 207 211 256 568		DIE SET					W167		U167/U568	U167/U568	U167/U568	U167/U568	L167	
168 208		DIE SET							U168	U168	U168	U168	L168	
169		DIE SET							U169	U169	U169	U169	L169	
170 306		DIE SET							U170	U170	U170	U170	L170	

See Footnotes at the beginning of chart

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES				
GROOVE						35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series
BURNDY	EEI	Type	Color	MR, MY	444S / 644 Series	MD / PATMD Series	Y29BH			
171		DIE SET				W171		U171	U171	U171
193		DIE SET						U193	U193	U193
202		DIE SET						U202	U202	U202
203		DIE SET						U203	U203	U203
204		DIE SET						U204	U204	U204
205 165 287 339		DIE SET				W165		U165/U205	U165/U205	U165/U205
206 166 459		DIE SET				W166		U166/U459	U166/U459	U166/U459
207 167 211 256 568		DIE SET				W167		U167/U568	U167/U568	U167/U568
208 168		DIE SET						U168	U168	U168
209		DIE SET						U209	U209	U209
210		DIE SET						U210	U210	U210
211 167 256 568		DIE SET				W167		U167/U568	U167/U568	U167/U568
236		DIE SET				W236		U236	U236	U236
237		DIE SET				W237		U237	U237	U237
238		DIE SET				W238		U238	U238	U238
239		DIE SET				W239		U239	U239	U239
240		DIE SET	RED			W240		U240	U240	U240
241		DIE SET				W241		U241	U241	U241
242 244	3S/4S	DIE SET				W242		U242	U242	U242
243		DIE SET				W243		U243	U243	U243
244 242	3S/4S	DIE SET				W242		U242	U242	U242
245	9A	DIE SET				W245		U245	U245	U245
246 248	5S	DIE SET				W248		U248	U248	U248
247		DIE SET				W247		U247	U247	U247
248 246	5S	DIE SET				W248		U248	U248	U248
249	11A	DIE SET				W249		U249	U249	U249
250		DIE SET						U250	U250	U250
251	12A	DIE SET	RED			W251		U251	U251	U251
252		DIE SET						U252	U252	U252
253		DIE SET						U253	U253	U253
254		DIE SET							S254	P254
255		DIE SET						U255	U255	L255
256 167 207 211 568		DIE SET				W167		U167/U567	U167/U567	U167/U567
257		DIE SET						U257	U257	U257
259		DIE SET						U259	U259	U259

See Footnotes at the beginning of chart

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES						
GROOVE						MD / PATMD Series	Y29BH	35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series
BURNDY	EEI	Type	Color	MR, MY	444S / 644 Series							L260
260		DIE SET										
261 318	15A	DIE SET						U261	U261	U261	U261	L261
263		DIE SET						U263	U263	U263	U263	
267		DIE SET						U267	U267	U267	U267	L267
275 164		DIE SET				W164		U164	U164	U164	U164	
276		DIE SET						U276	U276	U276	U276	
285		DIE SET						U285	U285	U285	U285	
287 165 205 339		DIE SET				W165		U165/U205	U165/U205	U165/U205	U165/U205	L165
292 578		DIE SET								S292	P292	L292
293 294		DIE SET										L293
296		DIE SET	TAN	MY293	1CRIMP			U25ART	U25ART	U25ART	U25ART	
		NEST								P27D		
		INDENTOR								P34PR5		
297		DIE SET	OLIVE	MY293	1CRIMP			U26ART	U26ART	U26ART	U26ART	
		NEST								P29D		
		INDENTOR								P34PR5		
298		DIE SET	WHITE	MY293	1CRIMP			U28ART	U28ART	U28ART	U28ART	
		NEST								P31D		
		INDENTOR								P45PR5		
299		DIE SET	BROWN		1CRIMP			U31ART	U31ART	U31ART	U31ART	L31ART
		NEST								P35D		
		INDENTOR								P48PR1		
300		DIE SET	PINK		1CRIMP			U34ART	U34ART	U34ART	U34ART	L34ART
		NEST								P39D		
		INDENTOR								P48PR1		
301		DIE SET	RED		1CRIMP					S39ART	P39ART	L39ART
		NEST								P45D		
		INDENTOR								P48PR1		
302		DIE SET	BROWN		1CRIMP					S44ART	P44ART	L44ART
		NEST								No Nest		
		INDENTOR								P48PR1		
303		DIE SET	GRAY		2 CRIMPS			U42ART	U42ART	U42ART	U42ART	
304		DIE SET						U304	U304	U304	U304	L304
305 341		DIE SET						U305	U305	U305	U305	L305
306 170		DIE SET						U170	U170	U170	U170	L170
308		DIE SET						U308	U308	U308	U308	
313		DIE SET						U313	U313	U313	U313	L313

See Footnotes at the beginning of chart

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES						
GROOVE		MR, MY	444S / 644 Series	MD / PATMD Series	Y29BH	35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series		
314 376		DIE SET										L314
316		DIE SET					U316	U316	U316	U316		L316
317 426		DIE SET					U317	U317	U317	U317		L317
318 261		DIE SET					U261	U261	U261	U261		L261
319		DIE SET							S319	P319		L319
320		DIE SET							S320	P320		L320
321		DIE SET					U321	U321	U321	U321		L321
322		DIE SET					U322	U322	U322	U322		
324		DIE SET	RED	1CRIMP			U29ART	U29ART	U29ART	U29ART		L29ART
		NEST								P32D		
		INDENTOR								P34PR5		
326 538		DIE SET					U33RT	U33RT	U33RT	U33RT		
327	14A	DIE SET					U327	U327	U327	U327		L327
328		DIE SET										L328
329		DIE SET					U329	U329	U329	U329		
331		DIE SET					U331	U331	U331	U331		
339 165 205 287		DIE SET					U165/U205	U165/U205	U165/U205	U165/U205		L165
341 305		DIE SET					U305	U305	U305	U305		L305
342		DIE SET							S342	P342		L342
344		DIE SET										L344
345		DIE SET										L345
346 ⑤		DIE SET	GRAY	1CRIMP			U6CABT	U6CABT	U6CABT	U6CABT		
348		DIE SET	PINK	1CRIMP			U2CABT	U2CABT	U2CABT	U2CABT		
350		DIE SET					U350	U350	U350	U350		L350
352		DIE SET							S352	P352		L352
373		DIE SET					U373	U373	U373	U373		
374		DIE SET	BLUE	MY293			U8CABT	U8CABT	U8CABT	U8CABT		
375		DIE SET	GREEN	MY293	1CRIMP		U4CABT	U4CABT	U4CABT	U4CABT		
376 314		DIE SET										L314
400		DIE SET	PINK				U38RT	U38RT	U38RT	U38RT		
403		DIE SET					U403	U403	U403	U403		
419		DIE SET							S419	P419		L419
422		DIE SET										L422
426 317		DIE SET					U317	U317	U317	U317		
459 166		DIE SET					U166/U459	U166/U459	U166/U459	U166/U459		
467		DIE SET	RUBY	MY293	1CRIMP		U27ART	U27ART	U27ART	U27ART		
		NEST								P30D		
		INDENTOR								P34PR5		

See Footnotes at the beginning of chart

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES						
GROOVE						MD / PATMD Series	Y29BH	35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series
BURNDY	EEI	TYPE	COLOR	MR, MY	444S / 644 Series							
468		DIE SET						U468	U468	U468	U468	
469		DIE SET								S469	P469	L469
470		DIE SET	BLUE	MY293	1CRIMP			U30ART	U30ART	U30ART	U30ART	L30ART
		NEST									P34D	
		INDENTOR									P48PRI	
471		DIE SET	GOLD	MY293	1CRIMP			U1CART	U1CART	U1CART	U1CART	
		NEST										
		INDENTOR										
472		DIE SET	GREEN	MY293	1CRIMP			U32ART	U32ART	U32ART	U32ART	L32ART
		NEST									P35D	
		INDENTOR									P48PRI	
473		DIE SET	BLACK	MY293	1CRIMP			U36ART	U36ART	U36ART	U36ART	L36ART
		NEST									P44D	
		INDENTOR									P48PRI	
474		DIE SET	GOLD	MY293	1CRIMP					S40ART	P40ART	L40ART
		NEST										
		INDENTOR										
478		DIE SET	BLUE	W163								L46ART
		NEST										
		INDENTOR										
479		DIE SET	RED									L48ART
490 547		DIE SET						U490	U490	U490	U490	L490
495		DIE SET										L495
505 163		DIE SET				W163		U163	U163	U163	U163	L163
511		NEST INDENTOR		MY293								
512		NEST INDENTOR		MY293								
513		NEST INDENTOR		MY293								
514		NEST INDENTOR		MY293								
515		NEST INDENTOR		MY293								
516		NEST INDENTOR		MY293								
517		NEST INDENTOR		MY293								
518		NEST INDENTOR		MY293								
519		NEST INDENTOR		MY293								

See Footnotes at the beginning of chart

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES						
GROOVE		MR, MY	444S / 644 Series	MD / PATMD Series	Y29BH	35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series		
BURNDY	EEI	TYPE	COLOR									
520		NEST INDENTOR		MY293								
538 326		DIE SET					U33RT	U33RT	U33RT	U33RT		
547 490		DIE SET					U490	U490	U490	U490	L490	
552		DIE SET					U552	U552	U552	U552		
568 167 207 211 256		DIE SET			W167		U167/U568	U167/U568	U167/U568	U167/U568		
575		DIE SET									L575	
576		DIE SET									L576	
578 292		DIE SET							S292	P292	L292	
579		DIE SET							S579	P579	L579	
587		DIE SET									L47ART	
607		DIE SET				U607	U607	U607	U607			
608		DIE SET				U608	U608	U608	U608	L608		
609		DIE SET				U609	U609	U609	U609			
627		DIE SET									L627	
642		DIE SET				U642	U642	U642	U642	L642		
643		DIE SET				U643	U643	U643	U643			
647 ⑥		DIE SET									L45ART	
648		DIE SET									L648	
654		DIE SET	PURPLE			U654	U654	U654	U654	L654		
655	13A	DIE SET				U655	U655	U655	U655			
658		DIE SET				U658	U658	U658	U658			
659		DIE SET			W659		U659	U659	U659	U659		
660		DIE SET			W660		U660	U660	U660	U660		
667		DIE SET									L667	
668		DIE SET				U668	U668	U668	U668			
676		DIE SET				U676	U676	U676	U676			
677		DIE SET				U677	U677	U677	U677	L677		
678		DIE SET				U678	U678	U678	U678			
679		DIE SET				U679	U679	U679	U679			
684		DIE SET									L684	
687		DIE SET			W687							
690	1S	DIE SET			W690		U690	U690	U690	U690		
691	2S	DIE SET			W691		U691	U691	U691	U691		
692	4S	DIE SET			W692		U692	U692	U692	U692		
693	6A	DIE SET			W693		U693	U693	U693	U693		
694	10A	DIE SET			W694		U694	U694	U694	U694		

See Footnotes at the beginning of chart

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES						
GROOVE						MD / PATMD Series	Y29BH	35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series
BURNDY	EEI	TYPE	COLOR	MR, MY	444S / 644 Series							
702		DIE SET				W702						
705		DIE SET						U705	U705	U705	U705	
717 ⑤		DIE SET								S717	P717	L717/L717W
718 ⑤		DIE SET										L718
719 ⑤		DIE SET								S719	P719	L719/L719W
720 ⑤		DIE SET								S720	P720	L720/ L720W
721 ⑤		DIE SET										L721
722 ⑤		DIE SET								S722	P722	L722/ L722W
723 ⑤		DIE SET										L723
724 ⑤		DIE SET								S724	P724	L724/ L724W
725 ⑤		DIE SET								S725	P725	L725/ L725W
726 ⑤		DIE SET										L726
727 ⑤		DIE SET										L727/ L727W
728 ⑤		DIE SET										L728/ L728W
729 ⑤		DIE SET										L729/ L729W
735 ⑤		DIE SET										L735/ L735W
740 ⑤		DIE SET										L740
786		DIE SET					U786	U786	U786	U786		
788		DIE SET					U788	U788	U788	U788		
789		DIE SET										L789
936 ⑤		DIE SET	YELLOW		1CRIMP		U39ART2	U39ART2	U39ART2	U39ART2	L39ART2	
997		DIE SET	ORANGE				U997	U997	U997	U997		
998		DIE SET					PU998	S998	P998			
999		DIE SET						S999	P999			
1011		DIE SET					U1011	S1011	P1011			
1012		DIE SET							S1012			
1013		NEST		MY2911			UV8L	UV8L	UV8L	UV8L		
		INDENTOR					Y34PL	Y34PL	Y34PL	Y34PL		
1014		NEST		MY2911			U6CD1	U6CD1	U6CD1	U6CD1		
		INDENTOR					Y34PR	Y34PR	Y34PR	Y34PR		
1015		NEST		MY2911			U4CD1	U4CD1	U4CD1	U4CD1		
		INDENTOR					Y34PR	Y34PR	Y34PR	Y34PR		
1016		NEST		MY2911			U3CD1	U3CD1	U3CD1	U3CD1		
		INDENTOR					Y34PR	Y34PR	Y34PR	Y34PR		

See Footnotes at the beginning of chart

Installation Tool Index

PRESENT INSTALLATION TOOL INDEX (continued)

DIE		DIE INFORMATION		DIELESS TOOLS		INSTALLATION TOOLING USING DIES						
GROOVE	EEI	TYPE	COLOR	MR, MY	444S / 644 Series	MD / PATMD Series	Y29BH	35 ① Series	750 ① Series	Y45 ② Series	46 ③ Series	60 Series
BURNDY												
		NEST										
		INDENTOR						Y34PR	Y34PR	Y34PR	Y34PR	Y34PR
		NEST										
		INDENTOR						Y34PR	Y34PR	Y34PR	Y34PR	Y34PR
		NEST										
		INDENTOR						Y34PR2	Y34PR2	Y34PR2	Y34PR2	Y34PR2
		NEST										
		INDENTOR						Y34PR2	Y34PR2	Y34PR2	Y34PR2	Y34PR2
		NEST										
		INDENTOR						Y34PR2	Y34PR2	Y34PR2	Y34PR2	Y34PR2
		NEST										
		INDENTOR						Y34PR2	Y34PR2	Y34PR2	Y34PR2	Y34PR2
		NEST										
		INDENTOR						Y34PR2	Y34PR2	Y34PR2	Y34PR2	Y34PR2
		NEST										
		INDENTOR						Y34PR2	Y34PR2	Y34PR2	Y34PR2	Y34PR2
		NEST										
		INDENTOR						Y34PR2	Y34PR2	Y34PR2	Y34PR2	Y34PR2
		NEST										
		INDENTOR						Y34PR2	Y34PR2	Y34PR2	Y34PR2	Y34PR2
		NEST										
		INDENTOR						Y34PR2	Y34PR2	Y34PR2	Y34PR2	Y34PR2
		NEST										
		INDENTOR									Y48PR1	
		NEST										
		INDENTOR									P48PR1	
		NEST										
		INDENTOR									P48PR1	
		NEST										
		INDENTOR									P48PR1	
		NEST										
		INDENTOR									P48PR1	
1102		DIE SET	WHITE								P1102	
1103		DIE SET	BLUE								P1103	
1104		DIE SET	BROWN					U1104			P1104	
1105		DIE SET						U1105			P1105	
		NEST										
		INDENTOR						Y34PR15	Y34PR15	Y34PR15	Y34PR15	Y34PR15

See Footnotes at the beginning of chart

Color Coding for Connectors (Overhead & CU/AL)

COLOR CODING FOR OVERHEAD CONNECTORS

Color Code	Wire Dia. per Strand			
	Str.	Compact	Sol.	ACSR
Brown	10		8	
Green	8		6	
Blue	5, 6		4	6
Orange	3, 4	#2	2	4
Red	1-19, 2	1/0	1	2
Yellow	1/0	2/0		1/0, 1
Gray	2/0	3/0		2/0
Black	3/0	4/0		3/0
Pink	4/0	266, 300		4/0
Red	250			
White	266			
Blue	300	350		266.8 (26/7, 18/1)
Brown	336			
Green	350, 397, 400			336.4 (26/7, 18/1)
Gray	450			
Pink	500			477 (18/1)
Green	556			
Purple	600			
Yellow				556.5 (24/7, 26/7)
Blue	650			
Red	700			
Yellow	750			
Orange	800			
White	900			
Brown	1000			

NOTE: This chart is only intended as a guide. For specific applications, refer to the catalog page of the connector.

COLOR CODING FOR AL/CU CONNECTORS

Color Code	Str.	Color Code	Str.
Blue	8	Blue	300
Gray	6	Brown	350
Green	4	Green	400
Pink	2	Pink	500
Gold	1	Black	600
Tan	1/0	Yellow	700/750
Olive	2/0	Red	700/750
Ruby	3/0	Brown	1000
White	4/0	Blue	1500
Red	250	Red	2000

NOTE: This chart is only intended as a guide. For specific applications, refer to the catalog page of the connector.

Color Coding for Copper Lugs and Splices

COLOR CODING FOR COPPER LUGS AND SPLICES

Color Code	Code Size		Flex Cable
	Str.	Sol.	
Red	8	6	8
Blue	6		6
Blue	5		
Gray	4		4
White	3	2	
Brown	2		2
Green	1		1
Pink	1/0		1/0
Black	2/0		2/0
Orange	3/0		3/0
Purple	4/0		4/0
Yellow	250		4/0 and 250
White	300		250
Red	350		313.1
Blue	400		373.7
Brown	500		444.4
Green	600		
Pink	700		535.3
Purple			600
Black	750		646
Yellow			777.7
Orange	800		
White	1000		
Yellow			1111
Green	1500		
Brown	2000		

NOTE: This chart is only intended as a guide. For specific applications, refer to the catalog page of the connector.

BURNDY Registered and Trade Names

Registered Name	Registered/Trade Name	Catalog Section	Registered/Trade Name	Catalog Section
4-POINT®	4-POINT®	N	MOLE™	A, K
BONDIT®	ALFLUID™	N	MOLIMITER™	K
BURNDY®	BARTAP™	A, E, L	OKLIP™	A, H
BURNDYWeld®	BONDIT®	E	PATRIOT®	N
The CONSTRICTOR®	BURNDYWeld®	E	PENETROX™	F
ENFORCER®	CABELOK™	H	POLYTAP™	A
GRIDMAX®	CLIPIT™	H	POPPER™	N
HYGROUND®	CRIMPIT™	C, E, H	POSI-PRESS™	N
IMPLO®	The CONSTRICTOR®	E	POWERLUG™	J
INFINITY DRIVE®	DURIUM™	F	QIKLINK™	A
IN-LINE®	ENFORCER®	N	QIKLITE®	E
PATRIOT®	FASTAP™	H	QIKLUG™	A, E
SERVIT®	FINGRIP™	B	QIKSHEAR™	A
WEEB®	FLEXITAP™	A	QIKTAP™	B
There is Only One IMPLO®	GRIDLOK™	E	SCRULLUG™	A
	GRIDMAX®	E	SERVIT POST™	E
	GROUNDLINK™	E	SERVIT®	A, H
	GROUNDMAX™	E	STIRRUP™	H, J
	HYCRAB™	K	STUDBUG™	E
	HYCRIMP™	H	SUPER-CLAMP™	E
Connecting Power to Your World®	HYDENT™	B, C	TAPIT™	H
	HYFLUID™	N	TRITAP™	A
	HYGRID™	E	U-BLOK™	A
	HYGROUND®	E	UNIGROUND™	E
	HYLINK™	B, C, E	UNIRAD™	G
	HYLUG™	B, C, E, H	UNISPLICE™	H
	HYPLUG™	C, H	UNITAP™	A
	HYPRESS™	N	VARILUG™	L
	HYREDUCER™	B, C	VARITAP™	A
	HYSEALPLUG™	H	VERSILUG™	A
	HYSEALUG™	H	VERSIPOLE™	A
	HYSPLICE™	C, H	VERSITAL™	E
	HYSTACK™	C	VERSITAP™	A, H
	HYTAIL™	E	VINYLUG™	B
	HYTAP™	C, E	VISEIT™	H
	HYTEE™	H	VISI-SHRINK™	D
	HYTOOL™	N	WEEB®	E
	INFINITY DRIVE®	N	WEJTAP™	J
	IN-LINE®	N	WIREMIKE™	N
	INSULUG™	B		
	KA-LUG™	A		
	KOMPRESSOR™	N		
	L'L CRIMP™	N		
	LINEMAN ASSIST™	H		
	LOKTAP™	H		

BURNDY Standard Terms and Conditions of Sale

1. Applicability. **BURNDY, LLC** ("Seller") hereby offers for sale to the buyer named on the face hereof ("Buyer") the products listed on the face hereof (the "Products") on the express condition that Buyer agrees to accept and be bound by the terms and conditions set forth herein. Any provisions contained in any document issued by Buyer are expressly rejected and if these terms and conditions differ from the terms of Buyer's offer, this document shall be construed as a counter offer and shall not be effective as an acceptance of Buyer's document. Buyer's receipt of Products provided hereunder will constitute Buyer's acceptance of these terms and conditions. This is the complete and exclusive statement of the contract between Seller and Buyer with respect to Buyer's purchase of the Products. No waiver, consent, modification, amendment or change of the terms contained herein shall be binding unless in writing and signed by Seller and Buyer. Seller's failure to object to terms contained in any subsequent communication from Buyer will not be a waiver or modification of the terms set forth herein. All orders are subject to acceptance in writing by an authorized representative of Seller.

2. Prices. Prices in written quotations issued by Seller are valid for thirty (30) days. All other prices are subject to change at any time, unless otherwise expressly agreed by Seller. Any prices shown in published literature are maintained as a general source of information and are not quotations or offers to sell. Seller reserves the right to make corrections due to typographical, clerical or engineering errors or due to incomplete or inaccurate information from Buyer. Prices for accepted orders may change due to customer order, quantity, material or engineering changes.

3. Taxes. Prices do not include any state, local, use or excise taxes, duties or other charges now or hereafter imposed for which Seller may be liable as a result of the sale, use or delivery of the Products ("Taxes"). In the absence of proper evidence of exemption supplied by Buyer to Seller, Buyer will be responsible for any and all such Taxes.

4. Minimum Order Quantity. Orders are subject to standard package sizes.

5. Payment Terms. Subject to credit approval, unless otherwise specified on the quotation or invoice, payment terms shall be Net 30 days from the date of invoice. All payment shall be in US dollars. If Buyer fails to pay any amounts when due, Buyer agrees to pay Seller interest thereon at a periodic rate of the greater of the maximum percentage allowed by law or 1% per month. Buyer will also be responsible for all costs and expenses, including attorneys' fees incurred by Seller in collecting any overdue amounts or otherwise enforcing Seller's rights hereunder.

6. Shipping and Delivery. Estimated delivery dates are provided in the quotation or acknowledgment, and shall not represent a fixed or guaranteed ship date. Unless otherwise agreed to by Seller, Seller reserves the right to ship at its convenience and/or ship and invoice for partial orders. All deliveries are FCA Seller's location (INCOTERMS 2010); freight may be pre-paid and added to invoice. Seller may stop delivery of Products in transit and/or withhold shipments in whole or in part if Buyer fails to make any payment to Seller when due or otherwise fails to perform under these terms. In the event of a delay due to any cause beyond Seller's reasonable control, Seller reserves the right to terminate the order or to reschedule the shipment within a reasonable period of time, and Seller shall not be responsible for any damages resulting from delay. If delivery is delayed due to any cause within Buyer's control, Seller may place the Products in storage at Buyer's risk and expense and for Buyer's account.

7. Title and Risk of Loss. Title and risk of loss to the Products shall pass to Buyer upon delivery by Seller to the carrier.

8. Cancellations. Returns. Orders may not be cancelled or modified once accepted by Seller unless agreed upon in writing by Seller. Any cancellation or return of Products shall be subject to Seller's return policies, and may be subject to Seller's cancellation or restocking fee. Seller's restocking policy is available upon request. Non-stock or special order items are non-cancellable and non-returnable. No returns shall be permitted without a Return Material Authorization (RMA).

9. Packaging. Allocation. All Products are packaged in accordance with Seller's standard packaging, unless otherwise agreed upon by the parties. Additional or modified packaging requirements may result in an increase in price. In the event of inability for any reason to supply the total demand for the materials or Products specified, Seller may allocate its available supply among any or all purchasers, at its discretion and without liability for failure of performance that may result therefrom.

10. Tooling. Any tooling required for an initial order will be billed to Buyer. Any Non-Recurring Engineering (NRE) charges invoiced by Seller shall not be deemed to grant any right, title or interest in any tools, dies, jigs, fixtures and items of like nature, or in any design, engineering, trade secret, patent or other proprietary rights embodied in the tooling, upon Buyer's payment of such charges and such items shall at all times be, and remain, the property of Seller.

11. Warranty.

11. Seller warrants that the Products will perform substantially in accordance with Seller's published specifications (or other applicable specifications as agreed upon in writing by Seller) and will be free from defects in material and workmanship, when subject to normal, proper and intended usage by properly trained personnel, for the following warranty period, which shall begin on the date of shipment by Seller (the "Warranty Period"): **(a) Tools:** The Warranty

Period shall be as specified in the product literature or, if no period is so specified, five (5) years; **(b) UL Listed Products:** the Warranty Period shall be two (2) years; **(c)** for all other products, the Warranty Period shall be 30 days. **(d) For UL Certified Compression Connection (the "Connection"),** provided that the Connection is made using (i) a recommended and properly calibrated tool, (ii) a recommended and properly calibrated die set, and (iii) a compression connector manufactured by Seller and specified in the UL Listing for such connection, and Buyer otherwise complies with the requirements set forth in the applicable UL Listing, Seller warrants that the Connection will conform with the UL Listing for a period of 5 years from the date the Connection is made, provided such Connection is made within one year of the purchase of the connector used in the Connection.

11.2 Remedies. During the Warranty Period, Seller agrees to repair or replace, at Seller's option, Products in order to ensure that the Products perform in accordance with the applicable specifications provided that Buyer shall (a) promptly notify Seller in writing upon the discovery of any defect, which notice shall include the product model and serial number (if applicable) and details of the warranty claim; and (b) after Seller's review, Seller will provide Buyer with a RMA. Buyer may return the defective Products to Seller with all costs prepaid by Buyer. In case of a defect in the Connection during the Warranty Period, Seller shall replace the connector used to make such connection. All replaced parts shall become the property of Seller. Shipment to Buyer of repaired or replacement Products shall be made in accordance with the Delivery provisions herein. Any consumables, including but not limited to, bulbs and batteries, are excluded from warranty. Seller will have no obligation to make repairs, replacements or corrections which are defective as a result of: **(i) normal wear and tear, (ii) Buyer's misuse, fault or negligence, (iii) use of the Products in a manner for which they were not designed, or (iv) improper storage, maintenance, installation and handling of the Products, and in the case of the Connection, Buyer's failure to use Seller's Tool, connector and die set Products, as specified in 11.1 (d) above, and in accordance with the requirements of the UL Listing for such Connection.**

If Seller determines that Products for which Buyer has requested warranty services are not covered by the warranty hereunder, Buyer shall pay or reimburse Seller for all costs of investigating and responding to such request at Seller's then prevailing time and materials rates. If Seller provides repair services or replacement parts that are not covered by this warranty, Buyer shall pay Seller therefor at Seller's then prevailing time and materials rates. **THE OBLIGATIONS CREATED BY THIS WARRANTY TO REPAIR OR REPLACE A DEFECTIVE PRODUCT SHALL BE THE SOLE REMEDY OF BUYER IN THE EVENT OF A DEFECTIVE PRODUCT OR SERVICE. EXCEPT AS EXPRESSLY PROVIDED HEREIN, SELLER DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, ORAL OR WRITTEN, WITH RESPECT TO THE PRODUCTS, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.** In no event will Seller's aggregate liability under warranty exceed the price paid by Buyer for the defective Product. Products supplied by Seller that are obtained by Seller from a third party supplier are not warranted by Seller. At its discretion and to the extent Seller is permitted, Seller agrees to assign to Buyer any warranty rights in such Product that Seller may have from the third party supplier. The Warranty Period for replacement Products shall be the remainder of the original Warranty Period.

12. Intellectual Property. Seller's specifications and design of the Products and any developments, improvements and intellectual property created under this order, whether made solely by a party or jointly by Buyer and Seller ("Intellectual Property") shall be owned by Seller. Buyer is not granted any interest, right or license with respect to any such intellectual property, except to the extent required to use the Products for the purpose for which it is specifically provided to Buyer in accordance with these terms and conditions.

13. Software. With respect to any software incorporated in or forming a part of the Products hereunder ("Software"), Seller and Buyer intend and agree that such Software is being licensed and not sold. Notwithstanding anything to the contrary contained herein, Seller or its licensor, as the case may be, retains all rights and interest in Software. Seller hereby grants to Buyer a royalty-free, non-exclusive, nontransferable license, without power to sublicense, to use Software provided hereunder solely in connection with the Products and to use the related documentation solely for Buyer's own internal business purposes. This license will terminate when Buyer's lawful possession of the Products ceases, unless earlier terminated as provided herein. Buyer agrees to not sell, transfer, license, loan or otherwise make available in any form Software to any third party. Buyer may not disassemble, decompile or reverse engineer, copy, modify, enhance or otherwise change or supplement the Software without Seller's prior written consent. Seller may terminate this license if Buyer fails to comply with any term or condition herein.

14. Indemnity. By Seller. Seller agrees to indemnify, defend and save Buyer from and against any and all damages, liabilities, actions, causes of action, suits, claims, demands, losses, costs and expenses (including without limitation reasonable attorney's fees) ("Claims") for (i) personal injury or death or damage to real property to the extent caused by the negligence or willful misconduct of Seller, its employees, agents or representatives in connection with the performance of services at Buyer's premises and (ii) claims that a Product infringes any valid United States patent, copyright or trade

BURNDY Standard Terms and Conditions of Sale

secret. Notwithstanding the foregoing, Seller shall have no liability to the extent any such Claims are caused by either (i) the negligence or willful misconduct of Buyer or third party, (ii) use of a Product in combination with equipment or software not supplied by Seller where the Product would not itself be infringing, (iv) Seller's compliance with Buyer's designs, specifications or instructions, (v) use of the Product in an application or environment for which it was not designed or (vi) service, installation or modification of any Product except by Seller. Buyer shall provide Seller prompt written notice of any Claims and Seller shall have the right to assume exclusive control of the defense of such claim or, at the option of the Seller, to settle the same. Buyer agrees to cooperate reasonably with Seller in connection with the performance by Seller of its obligations in this Section. Notwithstanding the above, Seller's infringement related indemnification obligations shall be extinguished and relieved if Seller, at its discretion and at its own expense (a) procures for Buyer the right, at no additional expense to Buyer, to continue using the Product; (b) replaces or modifies the Product so that it becomes non-infringing, provided the modification or replacement does not adversely affect the specifications of the Product or (c) if neither of the preceding is reasonably practicable, refund the purchase price for the Product. THE FOREGOING INDEMNIFICATION PROVISION STATES SELLER'S ENTIRE LIABILITY TO BUYER FOR THE CLAIMS DESCRIBED HEREIN.

By Buyer. Buyer shall indemnify, defend and hold harmless Seller from and against any and all Claims to the extent arising from or in connection with (i) the negligence or willful misconduct of Buyer; (ii) use of a Product in combination with equipment or software not supplied by Seller where the Product itself would not be infringing; (iii) Seller's compliance with designs, specifications or instructions supplied to Seller by Buyer; (iv) use of a Product in an application or environment for which it was not designed; or (v) modifications of a Product by anyone other than Seller.

15. Limitation of Liability. Notwithstanding anything to the contrary contained herein, Seller's aggregate liability for any claim of any kind shall not exceed the price paid by Buyer for the products giving rise to such claim. IN NO EVENT SHALL SELLER BE LIABLE FOR SPECIAL, INCIDENTAL, LIQUIDATED, OR CONSEQUENTIAL DAMAGES HOWSOEVER ARISING OUT OF SELLER'S PERFORMANCE (OR NON-PERFORMANCE) OF THE CONTRACT AND NOTWITHSTANDING WHETHER BUYER MAY HAVE BEEN ADVISED OR IS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

16. Compliance with Laws. Export Laws. Seller agrees to observe and comply with all applicable federal, state and local laws, rules, regulations, including but not limited to all applicable laws, regulations, laws, treaties, and agreements relating to the export, re-export, and import of any Product or part of Product. Buyer shall not, without first obtaining any required license to do so from the appropriate U.S. government agency; (i) export or re-export any Product or part of a Product, or (ii) export, re-export, distribute or supply any Product or part of a Product to any restricted or embargoed country or to a person or entity whose privilege to participate in exports has been denied or restricted by the U.S. government. At Seller's request, Buyer will provide information on the end user and end use of any Product or part thereof exported or to be exported by Buyer. Buyer shall cooperate fully with Seller in any audit or inspection related to applicable export or import control laws or regulations, and shall indemnify and hold Seller harmless from, or in connection with, any violation of this section by Buyer or its employees, consultants, or agents.

17. Miscellaneous. (a) Any legal claim shall be controlled under the laws of the state of the Seller's primary place of business. Seller and Buyer agree to accept and be bound by the exclusive jurisdiction of the federal and state courts thereof. The application to this Agreement of the U.N. Convention on Contracts for the International Sale of Goods is hereby expressly excluded.

(b) In the event that any one or more provisions contained in these terms shall be held by a court of competent jurisdiction to be invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall remain in full force and effect.

(c) Seller's failure to enforce or waiver of a breach of any provision contained herein shall not constitute a waiver of any other breach or of such provision.

(d) Any notice or communication required or permitted hereunder shall be in writing and shall be deemed received when personally delivered or three (3) business days after being sent by certified mail, postage prepaid, to a party at the address specified herein or at such other address as either party may from time to time designate to the other. (e) Buyer may not assign or delegate any rights or obligations without Seller's prior written consent. (f) Seller reserves the right to place a Lien and notifications of liens should Seller not be paid for equipment provided hereunder. (g) Buyer agrees that all pricing, discounts, data, design and technical information, operations/maintenance manuals, testing procedures, drawings, schematics and any other information regarding the Products or Seller's processes provided by Seller to Buyer are the confidential and proprietary information of Seller. Buyer agrees to (a) keep such information confidential and not disclose such information to any third party, and (b) use such information solely for Buyer's internal purposes and in connection with the Products supplied hereunder. Nothing herein shall restrict the use of information available to the general public.



		INSTALLATION TOOLING SYSTEM													
Conductor		LUGS & SPLICES One & Two HOLE				T&B Index	TAPS Thin-Wall C-taps Run=Tap, AWG only			TAPS Heavy Duty C-Taps Run=Tap			TAPS H-Taps Run=Tap		
							Die	Color	Index	Die	Color	Index	Die	Color	Index
#8/#6 sol	#8	W8CVT U8CRT	RED	49	21	W4CVT	GRAY	8	U240	RED	240	U11T-1	GREEN	11	
#6	#6	W5CVT U5CRT	BLUE	7	24	W2CVT	BROWN	10	UC	BROWN	C	UBGRT	ORANGE	BG	
#4	#4	W4CVT U4CRT	GRAY	8	29	W25VT	PINK	12	UC	BROWN	C	UC	BROWN	C	
#3/#2 sol		W3CRT U3CRT	WHITE	9		W26VT	BLACK	13	UC	BROWN	C	UC	BROWN	C	
#2	#2	W2CVT U2CRT	BROWN	10	33	W27VT	ORANGE	14	UC	BROWN	C	UC	BROWN	C	
#1	#1	W1CVT U1CRT-1	GREEN	11		W28VT	PURPLE	15	U997	ORANGE	997	U654	PURPLE	654	
1/0	1/0	W25VT U25RT	PINK	12	42 (45)	W29VT	YELLOW	16	U997	ORANGE	997	U654	PURPLE	654	
2/0	2/0	W26VT U26RT	BLACK	13	45 (50)		REFER TO CATALOG		U997	ORANGE	997	U654	PURPLE	654	
3/0	3/0	W27VT U27RT	ORANGE	14					U997	ORANGE	997	U654	PURPLE	654	
4/0	4/0	W28VT U28RT	PURPLE	15	54 (62)	-	-	-	U997	ORANGE	997	U654	PURPLE	654	
250	4/0/ 250 class G & H	W29VT U29RT	YELLOW	16		-	-	-	U997	ORANGE	997	U654	PURPLE	654	
300	262/ 250 class I, K & M	W30VT U30RT	WHITE	17		-	-	-	U1104	BROWN	1104	U1104	BROWN	1104	
350	313	W31VT U31RT	RED	18	71	-	-	-	U1104	BROWN	1104	U1104	BROWN	1104	
	350/ 373	W32VT U32RT	BLUE	19		-	-	-	U1104	BROWN	1104	U1104	BROWN	1104	
500	444	W34VT U34RT	BROWN	20	87	-	-	-	U1104	BROWN	1104	U1104	BROWN	1104	
	500/ 535	U38XRT	PINK	L99		-	-	-	P1103	BLUE	1103	PYFR	YELLOW	KR	
600		U36RT	GREEN	22	(99)	-	-	-	P1103	BLUE	1103	PYFR	YELLOW	KR	
700		U38RT	PINK	400		-	-	-	P1103	BLUE	1103	PYFR	YELLOW	KR	
750	646	U39RT	BLACK	24	106	-	-	-	P1103	BLUE	1103	PYFR	YELLOW	KR	
	750/ 777	U44XRT P44XRT-1	YELLOW	L115											
800		P40RT	ORANGE	25	(115)	-	-	-	P1102	WHITE	1102	PYFR	YELLOW	KR	
1000		P44RT	WHITE	27		-	-	-	P1102	WHITE	1102	PYFR	YELLOW	KR	



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