REPORT ON KINGS CRIMP

30th August, 1976.

NOTE: For restricted distribution.

CONFIDENTIAL

Introduction:

As a result of Sub-Contract works recently undertaken by the writer this report contains observations concerning the use of KINGS Crimp connectors and tooling.

Materials

2500m Surplus (used) BICC type T3141, T3205 in random lengths 10m through 150m.
110 Kings type KC 59-181 Crimp Plug.
100 Kings type KC19-115 Crimp Jack.

Tooling

Kings Type KTH-1000 Hand Crimp Tool
Kings Type KTH-2012 Crimp Dies for above.
Western Electronics CX-1 Stripping Tool.

Method

1. Cable was inspected for damage and the useful lengths measured and prepared at each end to receive the appropriate Crimp Connector.

2. Crimp connectors were fitted by the manufacturer's recommended method where possible otherwise were modified to fit properly.

Observations

The following observations were made concerning the KINGS Products and our comments relating to experience with SUHNER products is made alongside.

	OBSERVATIONS	COMMENTS
1.	Hexagonal crimp centre contact is inferior to square crimp. (Lower strength)	SUHNER use square; see crimp catalogue Page 1 - 2.
2.	Cross Hole (Solder Hole) on KINGS Jack occurs at the edge of the centre contact crimp and frequently the contact fractures as it is crimped.	SUHNER use longer crimp which does not effect solder hole. (See also Notes 7, 8, 26.)
3.	The plating on KING'S ferrules frequently cracks and peels off when it has been crimped.	We have never experienced this with SUHNER which exhibits better plating quality.
4.	KINGS contacts are not captivated and must be located in the connector body visually. On lower quality cables (and especially foam dielectric cables) there is frequently a tendency for movement to occur axially between the outer sheath, braid, dielectric and on rare occasions the centre conductor. If no captivation exhists the centre contact may withdraw into the connector body (resulting in high resistance contact or in extreme cases no contact at all) or protrude beyond the connector and causing damage to the mating connector as well.	SUHNER Crimp connectors have either partial or full 2 way captivation. See Crimp Catalogue Page 1, Fig. 1b thus ensuring perfect positioning of the contact by feel before crimping and permanent location except under extreme tension which normally will destroy the cable before the connector.

OBSERVATIONS	COMMENTS
4.(Cont) The flexing, bending and temperature cycling which occurs in most practical situations causes movement between the cables parts and when centre contacts are not captivated these contacts move in sympathy to the cable. During the crimping operation a small amount of movement occurs due to the position and nature of the cable sheath. Unless this movement is allowed for in the case of the non-captive contact then wide variance can occur in the placement of centre contacts in the connector body.	
5. KINGS centre contacts are - silver plated and subject to tarnishing and short mechanical/electrical life.	SUHNER contacts are Gold Alloy plated, non tarnishing with good electrical/mechanical life.
6. KINGS cable assembly details must be found by reference to their catalogue and are very poorly set out.	SUHNER supply quantities of individual instruction sheets with each box of connectors, extras on request.
7. The KINGS crimp die produces a very narrow crimp on the centre contact which results in very localised and deep deformation with poor physical strength and VSWR compared to a longer square form of crimp.	SUHNER use longer (or wider) crimp for centre contact exhibiting strength much in excess of mil-C-39012 requirement while maintaining low VSWR.
8. The portion of inner conductor which enters the centre contact hole is very short in the KINGS type. This makes for difficult insertion of the inner conductor since there is great tendency for the strands of cable to fray instead of entering the contact hole and in the case of the solid or single strand conductor (as with the stranded) there is a tendency for the contact to fall off before or during the presentation of the assembly up to the crimp tool.	SUHNER offer 4-5mm of inner conductor up into the centre contact and this minimises risk of contact falling off before crimp is effected, Also with longer bared conductor strands can be twisted together into compact bunch before offering up to contact hole.
8a. No noticeable chamfer or lead in is provided on the KINGS centre contacts and they are therefore very difficult to fit onto the centre conductors particularly of stranded cables.	SUHNER have a useful chamfer for the inner contact hole which simplifies fitting.
9. Some variance was detected in the size of the centre contact hole in the KINGS connectors. Where this hole was too small to get the conductor inside it was necessary to drill contact out to appropriate size.	Although on 1 or 2 occasions in over 5000 connectors a wrong size of contact has been found in suhner packet, the spare contacts provided offer immediate solution to this problem.
10. Internal burrs from the cross-hole drilling frequently restricted the proper insertion of the cable conductor until the KINGS connector was drilled out to remove burr.	SUHNER Connectors are burr free due to sharp drills and carefully devised drilling technique.

	OBSERVATIONS	COMMENTS
11.	No spare Contacts or Crimp Ferrules are provided with KINGS connectors. The loss or destruction of either of these items accidently, means the total loss of value of the KINGS connectors since connector bodies are rarely lost without the loss of these smaller parts.	SUHNER provide 2 spare contacts plus 2 spare ferrules with each box of connectors. Extra contacts and ferrules can be purchased for SUHNER connectors and therefore connector bodies can be recovered.
12.	KINGS Tools are not provided with any release mechanism. If the tool becomes fouled for any reason e.g. 1, Incorrect die 2. Incorrect connector part 3. Tool slips along from proper crimp position. 4. Foreign matter becomes lodged between dies etc. then it is necessary to destroy the connector or parts or to drive the tool beyond the designed crimp pressure and the tool may give because the elastic limit or yield point has been exceeded. When this permanent damage occurs proper crimps are no longer possible and the tool body (frame) must be withdrawn from service.	SUHNER Tools incorporate a release catch and straining the tool can be avoided with minimal effort.
13.	KINGS tool KTH-1000 has quick exchange dies, however the mechanism by which this is achieved is not always reliable and the dies tend to become withdrawn from the tool body, fouling the connector.	SUHNER interchangeable tools have the dies secured by a Allen head grub screw. An exchange system on the small SUHNER hand tool would be a desirable feature provided it does not suffer from the shortcomings of the KINGS tool.
14.	KINGS do not provide a cable cutting insert which is a convenient aid for proper cutting of coaxial cables especially for larger sizes.	SUHNER provide a cutting insert with the larger tools.
15.	KINGS connector packaging does not include the type number of connectors or assembly instruction reference on the airtight package. The Type No. is stamped on the connector body but is not easily read through the package printing. Connector impedance is not shown on KINGS connectors or packaging.	SUHNER provide both Part No. and Assembly reference of the air tight package. It would be an advantage if basic cable preparation could also be included on this package printing. Impedance is integral with Pt. No and package coding.
16.	KINGS tooling (which is actually made by Buchanan) exhibits low quality design and materials. The tool which we used had not received much use yet showed need for maintenance and low life expectancy.	SUHNER Tooling is of superior design and construction. Our tool is still giving perfect crimps after 5000+ connectors and we expect a further 10000+ before repair.
17.	The KINGS crimp spigot is split and when crimped may compress cable di-electric causing significant mismatch at UHF.	SUHNER spigot is solid.

	OBSERVATIONS	COMMENTS
18.	KINGS KC 59-181 and KC 19-115 are 50 connectors and will introduce a mis-match into 75 ohm transmission lines.	SUHNER make 75 ohm connectors for 75 ohm coaxial cables.
19.	The PTFE dielectric insulation in some KINGS connectors is loose in the connector body indicating poor machining tolerances or lack of quality control.	We have not experienced this with SUHNER.
20.	We understand that KINGS use Nickel alloy plating which being magnetic produces undesirable effects on the RF propogation.	SUCOPLATE contains no magnetic alloy and is produced by world leader electroplater.
21.	PTFE and other machining swarf has been observed in some KINGS connectors which may result in mating problems if not removed before assembly onto cables.	We have never observed any swarf in SUHNER connectors.
22.	The location of the crimp ferrule before crimping is required to be determined by guess since no shoulder exists against which the ferrule and crimp tool can abut before crimping.	SUHNER have convenient shoulder to abut ferrule and tool steady before and during crimp.
23.	To reset the handle and ratchet on the KINGS tool it is required to open the handles to a width which is too wide to comfortably grip with one hand and two operations or use of both hands is required unless the operator has very large hands.	SUHNER large tool has similar problems but since longer handles are used less effort is required.
24.	The moving lever of the handle of KINGS tool moves on the wrong side of the tool body creating an unnatural motion and poor tool control during crimping. The tool handles are also the wrong shape for comfortable use.	SUHNER small tool has comfortable grips and is easily used because of natural motion of levers. large tool can be bench mounted.
25.	KINGS ferrules and contacts are made either from "Hard Brass" or some hard (not annealed) alloy and are therefore very brittle resulting in poor crimp junction with cable.	SUHNER use special annealed Beril-ium, Copper, Gold plated centre co tacts, ferrules are of soft anneal copper. Work hardening occurs upo crimping.
26.	The KINGS tool weighs 800 grms with dies fitted and is tiresome to use.	Equivalent SUHNER tool weighs only 560 g.
27.	KINGS dies must be removed from the tool body before tool can be replaced into storage box.	SUHNER tools fit boxes with dies in the tool body except cutting insert.
28.	KINGS do not provide any device for bench mounting when large quantities of connectors are required to be fitted.	SUHNER have bench mounting plate for large hand tool only.
29.	No stress relief sleeves or colour coding devices are made by KINGS for their connec-tors.	SUHNER make coloured taper sleeves caps and washers.
30.	KINGS require different tools for double screened cables compared to single screen types therefore more tools are required for the same range of cable types.	SUHNER tools crimp both double and single screen types since wall thickness of ferrule varies.

	OBSERVATIONS	COMMENTS
31.	KINGS Crimp range includes:- INC, TNC N, C, UHF, MHV, SHV, SMA.	SUHNER have most comprehensive range of Crimp Connectors for BNC, TNC, N, C, UHF, SMA, SMC, SMB, SMS, H4, M, MCX, QLA, SHV etc.
3.2	With the KINGS tool the centre contact can be crimped at any point along the body of the centre contact and unless special care is taken to avoid misplacing the crimp a faulty joint can occur.	SUHNER contact is located in the die with a convenient jig or shoulder provided to ensure correct position of crimp.

CONCLUSIONS:

If the above observations are typical of KINGS the SUHNER Crimp technology is highly advanced and offers the most satisfactory results with least Operator skill or fatigue.

Longer and more reliable life can be expected from the SUHNER tooling and connectors in a wider range of situations.

A. W. DEVERELL

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