217832/2020/O/o PED/TI/RDSO

Research Designs and Standards Organisation
(Traction Installation Directorate)

Reasoned document of RDSO's Specification No. ETI/OHE/76(6/97) for hard drawn grooved copper(HDGC) contact Wire, which is now renamed as TI/SPC/OHE/CW/0971

1. RDSO's Specification No. TI/SPC/OHE/CW/0971 for hard drawn grooved copper(HDGC) contact Wirewas uploaded on RDSO website for 15 daysdated 28.08.2020 for seeking comments,
2. Comments/Suggestion received from viewers are as below.

Clause No.	Particular	Comments Received	RDSO's Remark
8.1.1(vii) and 8.5.7	Ultrasonic Testing of CCC wire rod	**M/s KEC** We are already using Continuous Cast Copper(CCC) wire rod for making contact wire. We procure CCC rod that already gets tested at the production stage by its manufacturer. Hitherto we have never found any defects in CCC Rod. We conduct flaw detection at CCC Rod stage. If any defect found then we reject the coil. When it comes to final stage hitherto we have never detected any flaw. Considering above factors, kindly exempt us from final stage flaw detection test of Contact Wire.	Not accepted. Any relaxation may affect the quality of contact wire.
		M/s Chandra Metals We are already using Continuous Cast Copper wire rod for making contact wire. CCC rod manufacturer also test defect during production. We are also using flaw detection machine on CC rod stage. If any defect found we reject the coil. No chance of any defect comes on final stage. In final stage, flaw detection is not needed. We never found any defect on CCC rod . Request to you remove flaw detection machine from final stage.	
		M/s JK Cables We are using Continuous Cast Copper wire rod for making of contact wire. CCC rod manufacturer also test defect during production. We are also using flaw detection machine on CC rod stage. If any defect found we reject the coil. No chance of any defect comes on final stage. In final stage, flaw detection is not needed. We never found any defect on CCC rod . Request to you remove flaw detection machine from final stage.	

		M/s Gupta Power We are using Continuous Cast Copper wire rod for making of contact wire. CCC rod manufacturer also test defect during production. We are also using flaw detection machine on CC rod stage. If any defect found we reject the coil. No chance of any defect comes on final stage. In final stage, flaw detection is not needed. We never found any defect on CCC rod . Request to you remove flaw detection machine from final stage.	
8.2	Acceptance Tests of CCC Rod	**CORE Allahabad** Specification may be reviewed to include the checks required to ensure correctness of counter, to avoid cases of supply of short drum lengths of Contact wire on account of faulty counter meter. Specification may be reviewed to include the aspect of actual weighment of Tare weight of drum during RITES inspection.	May be accepted
8.3.3	The manufacturer shall test every lot of CCC wire rods for chemical composition and micro-structure examination. The samples will be drawn in accordance with IS :191-2007 or latest	**M/s KEC** As per the clause 9.4.1 manufacturer test is in adherence to IS:9713-1938 or latest. Request you to kindly let us use the same IS for micro- structure examination too.	May be accepted.
		M/s Chandra Metals Conflict with clause 9.4.1. Sampling is defined by IS 9713 or latest. Kindly consider sampling as per IS 9713-1938	
		M/s JK Cables Conflict with clause 9.4.1. Sampling is defined by IS 9713 or latest. Kindly consider sampling as per IS 9713-1938	
		M/s Gupta Power Conflict with clause 9.4.1. Sampling is defined by IS 9713 or latest. Kindly consider sampling as per IS 9713-1938	

8.5.2	Discard approximately 2.5 meter length from the end of the coil.Three measurements at 60° angular displacement shall be made around the circumference at two places 4 meter apart. An average of six readings shall be considered as the diameter of the CCC wire rod. The diameter shall be as per column 2 of Table 3 of clause 6.2.	**M/s KEC** While manufacturing CC rod it is continuous process hence end of coil is starting of second coil, hence no need to discard 2.5 mtr length from each coil. Discarding 2.5 meter every time will result into scrap generation and will be more time consuming. Considering the above points, kindly allow us to incorporate this process only during Type Testing. **M/s Chandra Metals** There is no need to discard ech and every time 2.5 m length. Can we follow this process only in Type testing. **M/s JK Cables** There is no need to discard ech and every time 2.5 m length. Can we follow this process only in Type testing. **M/s Gupta Power** here is no need to discard ech and every time 2.5 m length. Can we follow this process only in Type testing.	The provision of discarding 2.5 m length from end of the coil is also given in IS 12444 for Continuously cast and rolled copper wire rods. Hence the comment is not accepted.
8.5.5	The material shall have the chemical composition as given in Table-2. The trace elements shall be determined by Spectrometric method. The copper shall be determined in accordance with IS: 440-1964 or latest. For oxygen content, certificate	**M/s KEC** Also if the CCC rod manufacturer using Electrolytic grade copper cathodes confirming to LME Grade A and supplying test certificate for the same. The chemical test already been conducted by the manufacture. From our part no change in the chemical properties been made. As per IS:191-2007 clause 7.2, we can use any established machine. In	Not accepted. RITES do not test CCC rod at the premise of CCC rod manufacturer. The CCC rod is tested at the premise of Contact wire manufacturer. Number of samples to be tested for chemical analysis at

	from the manufacturer of copper shall be furnished.	adherence to clause 7.2, at CCC Rod stage we can conduct this test using Spectrometer(For Cu + impurities + Oxygen content). Considering the above mentioned factors, kindly allow us to remove chemical testing from final stage and Copper testing (as per IS: 440-1964) only on CCC Rod stage.	CCC rod stage is very low (i.e 1 sample per 50 rods). Testing of final product (Contact wire) is essential to ensure the quality of final product, hence chemical testing from final stage could not be removed. Spectrometer gives copper content by difference method(100-trace elements) instead of tracing copper. Other method/equipment to determine Copper content with accuracy may be suggest. The same will be analysed.
		M/s Chandra Metals Manufacturer are doing chemical test on CCC wire rod. We are not doing any change in its composition. We are doing simple drawing process then why we are doing chemical test in each stage(on CCC wire rod & Final conductor). It is very important then we can do this on CCC wire rod stage with the help of Spectrometric method(For Cu + impurities + oxygen content). As per IS 191 clause 7.2 we can also use any of any established machine. Then why we are following this old time consuming method. If possible first remove chemical testing from final stage and second remove copper testing through IS 440 or latest. If this method is important then we can follow this method during CCC wire stage.	
		M/s JK Cables According to IS:440-1964 copper determined test method is by Electrolytic Analyizer method. On this method for one sample testing required time is approx. 16 hours. It is very old method. And now for the same testing latest method is tested by spectrometric. Therefore this test method should be by Spectrometeric for acceptance test as given below: The material shall have the chemical composition as given in Tabl-2. The trace elements shall be determined by Spectrometeric method .	
		M/s Gupta Power Manufacturer are doing chemical test on CCC wire rod. We are not doing any change in its composition. We are doing simple drawing process then why we are doing	

		chemical test in each stage(on CCC wire rod & Final conductor). It is very important then we can do this on CCC wire rod stage with the help of Spectrometric method(For Cu + impurities + oxygen content). As per IS 191 clause 7.2 we can also use any of any established machine. Then why we are following this old time consuming method. If possible first remove chemical testing from final stage and second remove copper testing through IS 440 or latest. If this method is important then we can follow this method during CCC wire stage.	
9.2	Acceptance Tests of Contact Wire	**CORE Allahabad** Specification may be reviewed to include the checks required to ensure correctness of counter, to avoid cases of supply of short drum lengths of Contact wire on account of faulty counter meter. Specification may be reviewed to include the aspect of actual weighment of Tare weight of drum during RITES inspection.	May be accepted
9.3.7	Routine Test Oxygen content	**M/s JK Cables** We purchasing Copper wire rod from RDSO approved sources and they are providing oxygen content test report. Therefore is should be as per CC wire rod supplier test report for acceptance test (Kindly note it already mention in the above clause 8.5.5) Therefore oxygen content test. Report should be accepted as per CC wire rod supplier test report for acceptance test.	Not accepted. The oxygen content test was included to ensure that CCC rod is manufactured by South Wire process. Para 8.5.5 is modified accordingly.
9.6.3.8	Three samples randomly selected out of six samples(six drums) shall be subjected to Microstructure examination.	**M/s KEC** RDSO approve CCC Rod post all the testings as per the specification. In case of any change of supplier from our side we will again follow the approval process. As micro-structure examination is more time consuming. Kindly allow us to do this test on one sample per lot (that we offer for final inspection) instead of one sample per six drums. **M/s Chandra Metals** Microstructure test is very time consuming. RDSO approved CCC wire rod after all the testing done as per specification. If we change the CCC wire rod supplier then we again will do approval process. If this test is very important then can we do this test on one sample against whole lot which we offered for final inspection.	Not accepted. Micro-structure of the Contact wire is an important property which decides the performance of Contact wire. Hence it is required to ensure that contact wire supplied to Indian Railways has equiaxed re-crystallised fine grains having grain size finer than ASTM-7

		M/s JK Cables Microstructure test is very time consuming. RDSO approved CCC wire rod after all the testing done as per specification. If we change the CCC wire rod supplier then we again will do approval process. If this test is very important then can we do this test on one sample against whole lot which we offered for final inspection.	
		M/s Gupta Power Microstructure test is very time consuming. RDSO approved CCC wire rod after all the testing done as per specification. If we change the CCC wire rod supplier then we again will do approval process. If this test is very important then can we do this test on one sample against whole lot which we offered for final inspection.	
10.3.6	Each drum of Contact Wire shall be provided with two colour bands alternatively each of red and yellow paint of approximately 75mm width each, at the top layer of Contact Wire for identification. Top end of the Contact Wire shall also be provided with lead seal by inspection authority by making hole from top lobe to bottom in the Contact Wire, in addition to punch mark provided by the manufacturer for identification of end. On receipt of Contact Wire drums, the colour bands, sealing at the end of Contact Wire and punch mark shall be verified by the consignee to ascertain correct receipt of length of Contact Wire.	**M/s KEC** In adherence to the sealing process, we have to make top to bottom hole. This increases the chances of drill machine slippage and have already resulted into injuries. To keep safety measure intact, allow us to drill the hole in the groove section or Only mention " Holes should be provided at both ends for lead sealing"	May be accepted
		M/s Gupta Power Can we do hole in groove section because at the time of making hole from top to bottom chances of slippage of drill machine and it causes injury. So many times our helpers has injured at time of making hole	
		M/s Chandra Metals Can we do hole in groove section because at the time of making hole from top to bottom chances of slippage of drill machine and it causes injury. So many times our helpers has injured at time of making hole	

		M/s JK Cables Can we do hole in groove section because at the time of making hole from top to bottom chances of slippage of drill machine and it causes injury. So many times our helpers has injured at time of making hole	
10.3.7	The emblem/identification mark of the Contact wire manufacturer and CCC Rod manufacturer with year of manufacture in 3 mm letter size shall be provided on the top lobe of the Contact Wire on regular intervals – not less than 40m and not exceeding 50m so as to facilitate identification. The marking shall be provided in the format mentioned in Clause 10.3.8 below and shall be such that it is not detrimental to the strength of the Contact Wire.	**M/s KEC** As per the clause 10.2, CCC Rod we provide suitable tags that has the manufacturer name and year of manufacturing. As per the clause 10.3.7 Identification marking of year on CCC Rod will result into defect throughout the length and impact our final product. To avoid this defect, you are requested to allow us to use 10.2 in place of 10.3.7 for CCC Rod and for Contact wire 10.3.8.	There is no provision regarding embossing on CCC rod. Marking shall be provided only on Contact wire in Format CCC/MMM/YY
		M/s Chandra Metals Identification marking of year on CCC rod will cause defect on whole length of CCC wire rod. It will impact on our final product. On contact wire we will follow the Clause 10.3.8 and for CCC rod they will provide suitable tags as per Clause 10.2	
		M/s JK Cables Identification marking of year on CCC rod will cause defect on whole length of CCC wire rod. It will impact on our final product. On contact wire we will follow the Clause 10.3.8 and for CCC rod they will provide suitable tags as per Clause 10.2	
		M/s Gupta Power Identification marking of year on CCC rod will cause defect on whole length of CCC wire rod. It will impact on our final product. On contact wire we will follow the Clause 10.3.8 and for CCC rod they will provide suitable tags as per Clause 10.2	