



HSC[®] RECOMMENDED TRANSPORTATION, HANDLING AND RUNNING PROCEDURES FOR SPECIAL ALLOY TUBING AND CASING

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1.0 Purpose:

1.1 To describe the procedure used by HSC[®] to assure that all HSC[®] special alloy tubing and casing is handled and run in such a manner as to limit possible damage to connections and pipe.

2.0 Scope:

2.1 This procedure, along with HSC[®] Quality Manual will be the basis for assuring that all guidelines and procedures are documented and implemented, and that the primary duties and responsibilities of HSC[®] are followed by HSC[®] personnel.

3.0 Associated Materials:

3.1 HSC[®] Quality Assurance Manual section

3.2 HSC[®] Quality Procedure Manual section

4.0 Quality records:

4.1 Complete all necessary paperwork and service reports. Report any problems to operations manager. Follow the attached guidelines.

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PREFACE

The following items should be used as basic guideline for handling special alloy tubulars. If the tubulars should abruptly strike one another or a steel surface, the resulting damage might cause the development or acceleration of a corrosion site.

If there is a possibility that the tubulars may abruptly strike any steel object, the object should be covered with rubber, PVC, neoprene, wood or any other material, which will provide adequate protection. All personnel handling these goods should be advised of the delicate nature of them. **DO NOT** place any weight on top of these tubulars!



1. TRANSPORTATION

1.1 WATER TRANSPORTATION

- a. If the tubulars are not crated or bolstered, prior to loading, place three supports on the deck. For special alloy tubulars, we recommend using four by fours. The supports should be positioned as to prevent bending of the tubulars. A chock should be placed between each joint for transporting. The chocks should be placed on either end and in the centre at the "stripping" locations. The chock should be of sufficient size to prevent the joints from contacting each other during the roughest transport conditions.
- b. Load the tubulars so that all of the box ends are on the same end of the boat.
- c. For each additional tier, place stripping material directly over the first set of supports.
- d. Wooden or plastic chocks should be securely placed on the stripping on each side of every tier.
- e. Load binders should be placed directly over the supports, and should be secured tight enough to prevent rolling and shifting. Use wood or rubber to prevent metal to metal contact between the tubulars and binders, or use fabric strap binders.
- f. The tubulars should be handled as outlined in Section 2.
- g. The tubulars should be in a position on the vessel so that contact with corrosive materials will not occur.

1.2 TRUCK TRANSPORTATION

- a. If the tubulars are not crated or bolstered, prior to loading, place three supports on the deck. For special alloy tubing, we recommend using four by fours. The supports should be positioned as to prevent bending of the tubulars. A chock should be placed between each joint for transporting. The chocks should be placed on either end and in the centre at the "stripping" locations. The chock should be of sufficient size to prevent the tubulars from contacting each other during the roughest transport conditions.
- b. Load the tubulars so that all of the box ends are on the same end of the truck.



- c. For each additional tier, place stripping material directly over the first set of supports.
- d. The tubulars should be limited on each tier so that chafing from the side rails will not occur.
- e. The flat portion of the side rails should be facing the tubulars. They should be covered with wood, rubber, or PVC.
- f. Wooden or plastic chocks should be securely placed on the stripping on each side of every tier.
- g. Load binders should be placed directly over the supports, and should be secured tight enough to prevent rolling and shifting. Use wood or rubber to prevent metal to metal contact between the tubulars and binders, or use fabric strap binders.
- h. After a short distance, retighten all load binders, which have loosened as a result of shifting. Also insure no metal to metal contact is occurring.
- i. The tubulars should be handled as outlined in Section 2.

2. OFFLOADING

2.1 MARINE

- a. Prior to any movement, make sure protectors fit correctly and are on tight. Strap wrenches should be used to tighten loose protectors. Avoid the use of pipe wrenches.
- b. The use of end hooks is **NOT** recommended. A spreader bar and rated straps should be used.
- c. One crate or bolster should be offloaded at a time. If more than one uncrated tubular is to be lifted with a crane, each tubular should have a grass mat or large rope ring placed around each end and in the centre of each tubular. The number of tubing lifted at one time should be limited to four so that during the lift they will not twist and come into contact with each other and casing should be limited to one.
- d. Raise the load as gently as possible.
- e. Care should be taken that the tubulars will not be bumped into other objects.
- f. Place the tubulars so that the box ends are closest to the vee door.
- g. Do not allow the tubulars to be dropped. Set the load down gently.
- h. Remove the slings or straps.



- i. When rolling the tubulars, **DO NOT** allow a tubular to contact another tubular with momentum, even if thread protectors are in place.
- j. A minimum of three pipe racks or support points is recommended for special alloy tubulars. The box end support should be elevated two inches above the pin ends and the centre support should be elevated one inch above the pin end. (This procedure is recommended for rig site situations and not for storage.) This will allow cleaning solvents or water to flow out of the tubulars. All three-support points should be covered with wood or any material, which will provide adequate protection. While it is not mandatory, it is advantageous to cover the stripping with rubber or some type of soft material. This will prevent the tubulars from rolling without assistance from personnel.
- k. Once the tubulars are on the pipe racks, chocks or rope rings (if they will provide adequate protection) should be used to prevent the tubulars from contacting one another.
- l. For each additional tier, place stripping material directly over the first set of supports.
- m. Chocks should be securely placed on the stripping on each side of every tier.
- n. The tubing should not be stacked more than five tiers high and the casing not is stacked more than 3 tiers high.

2.2 LAND OFFLOADING

- a. If a crane is to be used, refer to the guidelines in section 2.1.
- b. If a forklift is to be used, the forks of the forklift should be covered to prevent any possible contact with the tubulars.
- c. Position the truck so that the boxes will be close to the vee-door and the tubulars can be transported with as little movement as possible.
- d. Place the tip of the forks at the edge of the truck just below the first tier. Gently roll the tubular down the forks.
- e. **DO NOT** allow the tubular to contact another tubular with momentum.
- f. **DO NOT** move more tubulars that can be fully controlled and safety handled.
- g. Place the tip of the forks lower than the pipe rack and roll off one tubular at a time. Again, **DO NOT** allow one tubular to contact another tubular with momentum.



- h. If no forklift is on location, place three or more boards (enough to safely support the weight) against the truck and roll off one tubular at a time using the boards as a ramp. **DO NOT** allow the tubular to roll freely; allow for sufficient personnel to safely control the tubular.

3. PRE-RUNNING PREPARATION

3.1 PRE-RUNNING PREPARATION

- a. While the tubulars are on the rack, remove the pin and box end protectors.
- b. If a drift check is to be performed, it should be performed prior to cleaning. A Teflon drift is recommended for drifting the tubulars. The drift tape should be coated as to adequately protect the tubulars from metal to metal contact. Any clevises or chains should also be wrapped. Check with an HSC[®] representative as to drift direction specifications. But generally, this direction will be box end to pin end, to prevent trash from the tubular being dragged into the box connection.
- c. Thoroughly clean and dry the connections. If any debris is present, repeat. **DO NOT** use diesel as a cleaning solvent. (We recommend the use of a hot water pressure washer or a steam cleaner without any solvents, since they will leave no residual film. The HSC[®] connection may need to be coated with dry moly and a Varsol or soap film may impair its adherence.) Use all means necessary to prevent environmental pollution.
- d. Visually inspect the threads.
- e. Minor damages to the threads can be repaired at this time using a fine triangular file. No repair is to be carried out on the seal area. Refer seal damage to HSC[®] representative. Tubulars with irreparable damage should be marked accordingly and laid aside.
- f. Records should be kept on all repairs or rejects.
- g. Check the inside of the tubulars for foreign material. If any is present, remove with compressed air.
- h. Any out of roundness should be closely evaluated, as this can greatly reduce the collapse strength.
- i. Clean and dry pin and box end protectors should be placed back on the connections.



NOTE: Tubular preparation should be limited to quantities that will be run within a reasonable time span, to reduce the possibility of rusting and pitting.

3.2 RIG SITE PREPARATION

- a. The travelling block should be aligned with the well bore.
- b. Verify that the wear bushing has been pulled or that the I.D. is sufficient to pass all string components.
- c. Verify that the B.O.P.'s have been fitted with the proper size pipe rams.

Calculation of Running Length - HSC[®] Premium & HICOM[™]

Note: When lengths of HSC[®] Premium or HICOM[™] threaded OCTG are made-up; one thread length of every joint is "buried" in the mating coupling, so that the RUNNING LENGTH is the overall TALLY LENGTH less the length of one pin thread for each pipe length.

If pipe is to be tallied the make up loss must be recorded on the service report.

FOR HSC[®] Premium

<u>O.D. (inches)</u>	<u>Makeup loss (inches)</u>
2 3/8	2.514
2 7/8	2.829
3 1/2	3.274
4	3.528
4 1/2	3.969
5	4.724
5 1/2	4.85
6 5/8	4.965
7	5.228
7 5/8	5.406
8 5/8	5.545
9 5/8	5.545
10 3/4	5.589
11 3/4	5.589
13 3/8	5.642

: Information taken from HSC[®] Technical Catalogue



FOR HSC® HICOM™

<u>O.D. (inches)</u>	<u>Makeup loss (inches)</u>
2 3/8	2.205
2 7/8	2.205
3 1/2	2.830
4	2.997
4 1/2	3.164
5	3.730
5 1/2	3.730
6 5/8	3.730
7	3.730
7 5/8	4.130
7 3/4	4.130
8 5/8	4.530
9 5/8	4.930
9 7/8	4.930
10 3/4	5.330
11 3/4	5.330
11 5/8	5.330
13 3/8	5.330
13 5/8	5.330
14	5.330

: Information taken from HICOM™ Technical Catalogue

3.3 RUNNING AND HANDLING EQUIPMENT

NOTE: All handling equipment should provide maximum protection against tubular damage. In order to do so, all equipment should provide the longest practical or necessary die surface. All dies should be non-directional.

- a. Ensure that the slips are in good working condition, are fitted with the proper size dies, and will accommodate the weight of the string.
- b. Ensure that the elevators are in good working condition, are fitted with the proper size dies, and will accommodate the weight of the string. **DO NOT** use bottleneck elevators. Use slip type elevators for tubing, and spider type for casing.



- c. The power tongs should be rated for the torque that is to be applied. They should be fitted with the proper size and type of dies. The dies should conform to the curvature of the tubular. Hand held or hydraulic integral backup equipped tong is recommended for tubing. If it is not available, the snub line should be at a 90-degree angle with the tongs and level. Rig backup tongs are recommended for casing until a sufficient weight has been run.
- d. A calibrated power tong torque gauge should be placed in the snub line. For optimum performance, optimum torque applied should be approximately half of the gauge scale. The handle length of the power tongs should match the handle length for the torque gauge. PSI gauges are not suitable for running HSC[®] production tubing or casing.
- e. At all times must a computerised torque control system be used.
- f. A stabbing board should be utilised to maintain vertical alignment throughout stabbing and make-up. A stabbing yoke may also be used.
- g. Lift plugs should be utilised for connection protection and personnel safety. They should be inspected for overall condition and checked manually to insure proper fit.
- h. A stabbing guide should be used whenever possible. It should be in good working order and provide adequate connection protection when stabbing. It should be checked manually for proper fit.
- i. Thread compound, which is approved by the threading manufacturer, should be on location in sufficient quantities. The appropriate applicators should also be present.
- j. A safety clamp should be available. It should be in good working condition and sized for the tubulars and accessories.
- k. A T.I.W. valve rated for the maximum anticipated pressure should be on location. If the valve connections are not compatible with the HSC[®] connection, crossovers to all connections being run should be present.
- l. A pickup line in good condition should be used. It may be constructed of rope or nylon. Insure that whichever material is used is rated for the weight.
- m. If rabbits are to be used during the running of the tubulars, they should be measured to insure the O.D.'s are the correct size. The rabbits should be constructed of a material such as Teflon. The rabbit should be manually inserted into the tubular to insure proper fit.



- n. If a pickup/laydown unit is not to be used, the catwalk and the vee-door should be covered with wood.
- o. If a pickup/laydown unit is to be used, the pickup arms, trough and backstop should be coated.

3.4 Tubing and Casing String Accessories

NOTE: It is preferable to make in-string accessories up in assemblies. This can be performed at any assembly makeup facility. The assembly can be made up to full torque (most assembly make-up companies will provide computerised connection makeup monitoring). It may also be full length drifted and pressure tested. This will virtually eliminate rig down time and connection damage from problems associated with different OD's and lengths of the accessories.

- a. All accessories that are to be a part of the tubing or casing string should be located and checked against the string design.
- b. Any accessories that are not present, or do not conform to the string design should be brought to the attention of an HSC[®] representative.
- c. All accessories that are similar, yet slightly different, should be noticeably marked to indicate the position that they are to be run in the string.
- d. All accessories should be drifted if possible. Accessories with restricted I.D.'s may also be drifted if arrangements have been made to have reduced size mandrels present.
- e. Note if any accessories will require additional make-up or handling equipment.
- f. Thoroughly clean and dry all the accessory connections.
- g. Visually inspect the threads.
- h. Minor damages to the threads can be repaired at this time using a fine triangular file. No repair is to be carried out on the seal area. Refer seal damage to HSC[®] representative.
- i. Any connections that cannot be field repaired should be marked accordingly. Replacement accessory(s) should be ordered, or the damaged part should be re-threaded, time permitting.
- j. Verify correct mill end make-up.
- k. Clean and dry protectors should be placed back on the connections.



1. If the accessories will not be run in a reasonable period of time, oil or thread/storage compound should be applied.

4. RUNNING AND PULLING SINGLES

NOTE: DO NOT MAKE-UP HSC[®] WITH ANY OTHER CONNECTIONS OTHER THAN HSC[®], OR A CONNECTION APPROVED BY HSC[®], AS SEAL DAMAGE WILL OCCUR.

Note: Occasionally it is found that the torque meter/load cell is calibrated for a power tong with a radius arm other than the one being used. In such instances adjustment has to be made to the features read-out on the torque gauge.

$$\text{Torque applied} = \frac{(\text{gauge reading}) \times (\text{actual tong arm length})}{\text{tong arm length (marked on the gauge)}}$$

4.1 RUNNING

- a. Gently roll one tubular at a time into the pickup trough. Insure that thread protectors are snugly in place prior to doing so. Transport the tubular to the rig floor. If a pickup/laydown unit is not present, transport the tubular to the vee door as outlined in Section 2.1 a-h.
- b. Remove the box end protector(s).
- c. A clean handling plug should be installed. This will reduce the possibility of the tubular slipping out of the pickup line and reduce the possibility of the test tool or elevators damaging the connection.
- d. If the tubular is to be rabbitted/drifted, the rabbit/drift should be placed in the tubular after installation of the handling plug. If the rabbit/drift is not clean, it should be cleaned and dried prior to placing it in the tubular. Should the rabbit/drift stop in the tubular, it should be broken free by easily pushing or tapping an object from either end. **DO NOT** beat or tap the outside or end of the tubular with any hard object.
- e. Attach the pickup line and raise the tubular at a moderate speed, for both safety and tubular protection.
- f. Remove the pin end protector, the rabbit/drift, and inspect/re-inspect the pin end connection.
- g. If any debris is present, the pin connector should be wiped, or blown clean.



- h. If applicable, apply thread compound to the pin end connector. Application of thread compound should be controlled and thorough. HSC[®] recommend moly-coat to be applied prior to doping, it should be sprayed lightly and evenly and allowed to dry completely prior to doping.
- i. Remove the lift plug from the box end in the rotary.
- j. If debris is present, the box connection should be wiped, or blown clean.
- k. If applicable, apply thread compound to the box end connector. Application of thread compound should be controlled and thorough. HSC[®] recommend moly-coat to be applied prior to doping, it should be sprayed lightly and evenly and allowed to dry completely prior to doping.
- l. Place the stabbing guide over the box end connector.
- m. Slack off of the tubular in the pick up line. The tubular should be lowered slowly as to minimise starting thread damage.
- n. The stabber should stab the tubular and hold it as close to true vertical at all times. **NOTE:** He should be advised not to hold the lift plug. Doing so might cause the lift plug to unscrew when turning the tubular.
- o. Remove the stabbing guide and the pick up line.
- p. Start the connection by hand and add additional torque using a nylon strap wrench to prevent connection damage.
- q. Apply the power tongs and begin makeup at no more than five to ten R.P.M.'s. If torque is achieved prematurely, stop makeup immediately and check vertical alignment. Attempt makeup again. If premature torque is still present, back out the connection and check for damage. Repair or lay the joint aside and proceed. As torque is encountered in an acceptable makeup, tong speed should be slowed to three to five R.P.M.'s. The shoulder torque should be visually verified. Peak torque should be achieved as slowly as possible. This will allow the torque to be transmitted through the mechanics of the tongs and be applied to the connection.

Recommended HSC[®] torques must be applied as stated in HSC[®] PREMIUM or HICOM[™] Technical Catalogue or as stated on the HSC[®] website.

NOTE: Five R.P.M.'s = 12 seconds per rotation



- r. Remove the power tongs, and review the torque turn graph. Back out any connections which the graph indicates a potential problem.

Note: * Shouldering parameters will be 5% to 70% of the final torque.

*** Only graphs giving Torque versus Turns will be considered; graphs giving Torque versus Time cannot be compared to Torque versus Turns.**

- s. If testing above the rotary, insert the internal test tool or apply the external test unit. You should not perform this step until **FULL** torque has been applied to the connection.
- t. After full torque has been achieved, latch the elevators as gently as possible, and raise the block at a slow speed. If the block is raised too rapidly, swaging of the tubular might occur.
- u. Pull the slips and lower the string.
- v. Stop downward movement of the string and either set the slips or firmly hold them around the tubular. Assure that the slips are set or are placed correctly and gently set the string weight on the slips. Applying weight too rapidly may be the cause of mashed or swaged tubulars.
- w. Attach the pickup line to the next tubular to be run and unlatch the elevators from the last tubular run. Hold the elevators far enough away from the tubular in the rotary to prevent contact, and raise the block at a moderate speed.
- x. If the tubular is to be tested below the rotary, insert the internal test tool. To prevent connection damage, leave the handling plug **COMPLETELY** made up until the test tool has been removed from the tubular.

4.2 PULLING SINGLES

- a. Install lift plugs, gently latch the elevators around the tubular in the rotary, and raise the block at a slow even speed.
- b. Stop movement of the string and either set the slips or firmly hold them around the tubular. Assure that the slips are set or are placed correctly and gently set the string weight on the slips.
- c. Unlatch the elevators and raise them above the tubular to be backed out.



- d. Have the stabber hold the tubular to be backed out as close to true vertical as possible.
- e. Apply the power tongs and slowly apply torque until the connection breaks. Back out the connection slowly (5 R.P.M.'s maximum) until most of the interference is no longer present. Remove the power tongs. Finish backout by hand or strap wrench. Stop when the connection "hops" once.
- f. Attach the pickup line.
- g. Latch the stabbing guide around the box end to reduce jump out damage.
- h. Gently raise the tubular. If the connection does not appear to be free, turn counter clockwise one half turns and try to lift again.
- i. Dope the pin connection thoroughly and install a clean thread protector.
- j. Slowly set the joint in the vee door.
- k. Remove the pickup line and the lift plug.
- l. Dope the box connector thoroughly and install a clean thread protector.
- m. Transport the tubular as outlined in Section 2.

5. PULLING AND RUNNING STANDS

5.1 PULLING STANDS - This is not recommended.

- a. Gently latch the elevators around the tubing or casing in the rotary and raise the block at a slow even speed until the elevators are supporting the full string weight.
- b. Stop movement of the string at the desired breaking point. Set the slips or firmly hold them around the tubing or casing. Assure that the slips are set or are placed correctly and gently set the string weight on the slips.
- c. Allow the block movement to subside as much as possible and apply the power tongs.

NOTE: If the stand tends to "belly" place a stabber on the stabbing board to help maintain vertical alignment.

- d. Apply the power tongs and slowly apply torque until the connection breaks. Back out the connection slowly (5 R.P.M.'s) until most of the interference is no longer present.



- Remove the power tongs. Finish backout by hand or strap wrench. Stop when the connection "hops" once.
- e. Latch the stabbing guide around the box end to reduce jump out damage.
 - f. Slowly raise the stand. If the connection does not appear to be free, slack off, turn the connection counter clockwise one half turns, and try to lift it again.
 - g. Apply a pin protector and rack the stand back.

5.2 RUNNING STANDS – This is not recommended

- a. Gently latch the elevators on a stand and raise the stand.
- b. Remove the pin protector and clean the pin connector.
- c. Inspect the pin connector, and if applicable, apply thread compound.
- d. Clean the box connector in the rotary.
- e. Inspect the box connection, and if applicable, apply thread compound.
- f. Place the stabbing guide over the box end connector.
- g. Slowly lower the stand.
- h. Remove the stabbing guide and allow the block movement to subside as much as possible.
- i. Apply torque as outlined in Section 4.1-q.

NOTE: If the stand tends to "belly" place a stabber on the stabbing board to help maintain vertical alignment.

- j. Remove the power tongs.
- k. Raise the block slowly and remove the slips.
- l. Lower the string and stop downward movement. Set the slips or firmly hold them around the tubing or casing. Assure that the slips are set or are placed correctly and gently set the string weight on the slips.
- m. If the tubing or casing is to be internally tested, install a lift plug prior to inserting the test tool. **DO NOT** remove the lift plug until the test tool has been removed.



6. PROCEDURE NOTES

When inspecting tubular goods on a rig site, it is not uncommon to find connections that are damaged, but not severe enough to justify rejection. You may opt to lay these joints aside in order to have the best condition tubulars in your well. When this situation is encountered on a rig site it will be the operator representative's decision whether to run the joint or lay it aside.

Rig Site Marking Guidelines for Damaged Connections

Pin end connection reject: One red paint band on pin end and one red paint band in the centre of the tube. Description of the damages written on the joint with a permanent metal marker.

Pin end connection questionable: One yellow tape band on pin end and one yellow tape band in the centre of the tube. Description of the damages written on the joint with a permanent metal marker.

Box end connection reject: One red paint band on box end and one red paint band in the centre of the tube. Description of the damages written on the joint with a permanent metal marker.

Box end connection questionable: One yellow tape band on box end and one yellow tape band in the centre of the tube. Description of the damages written on the joint with a permanent metal marker.

Tube body reject: Two red paint bands in centre of tube, damaged area circled with a permanent metal marker, and damage description written on the joint with a permanent metal marker.

Tube body damage: Two yellow tape bands in centre of tube, damaged area circled with a permanent metal marker, and damaged description written on the joint with a permanent metal marker.



7. YARD AND RIG SITE VISUAL INSPECTION FOR HSC® PREMIUM AND HICOM™ CONNECTIONS

1. Arrive on location and authenticate that pipe is the correct size, weight and grade to be inspected.
 - a. This can be done using the information on the work order in conjunction with the pipe-stencilling, grade bands, connections, and the I.D./O.D. of the pipe.
2. Make sure that the pipe is cleaned sufficiently.
 - a. The pipe should be free from all dope, drilling fluids and other debris. If pipe is not cleaned thoroughly, you could miss minor defects.
3. Make sure that the lighting and the weather conditions are such that you can perform the class of inspection that is required. If they are not adequate for your inspection, then this should be brought to the operations groups attention.
4. Threads should be inspected for:
 - a. Excessive handling damage
 - b. Galling or tearing
 - c. Pits and/or corrosion
 - d. Fatigue cracks, particularly near the last engaged threads on the pin
5. Inspect metal-to-metal seal and torque shoulders for:
 - a. Longitudinal cuts and/or scratches across more than 50% of the seal(s)
 - b. Pits and/or corrosion
 - c. Dents and/or mashed areas
 - d. Galling or wear
 - e. Rolling or yielding of torque shoulder
 - f. Yielding of pin nose/or pin seal
 - g. Any combination of a-f adjacent to each other

Any questions not covered in this procedure should be addressed with the HSC® technical department.