A Comparison of BS EN 287 Part 1.2011 with BS EN ISO 9606: Part 1.2013

Job Knowledge 130

ISO 9606 Part 1 was published in November 2013 and replaces EN287 Part 1 which will be withdrawn in October 2015. There are some differences between the two specifications with respect to the essential variables and their ranges of approval. An essential variable is a welding parameter or characteristic that, if changed outside its range of approval, requires the welder to be re-qualified. Since a welder qualification test is a test of the welder's skill the essential variables and the ranges of approval of a welder qualification test are not necessarily the same as those of a welding procedure qualification test. The relevant essential variables are listed in Table 1 for both specifications. The differences between the two are highlighted in yellow.

Between now and October 2015 EN 287 Part 1 may still be used and a welder qualification carried out to EN287-1 during Oct 2015 would remain valid up until Oct 2017, at which time welders qualified in accordance with EN 287 Pt1 must be retested in accordance with ISO 9606 Pt 1 OR a welder qualification certificate compliant with ISO 9606 Pt 1 issued by the examining body. The Introduction to ISO 9601 Pt1 states that ".... at the end of its period of validity, existing qualification tests of welders in accordance with .....a national standard may be revalidated according to this International Standard.....providing that the technical intent .....is satisfied....". The test methods and acceptance standard are identical so it should be possible for the examining body to issue a new certificate taking account of any changes in the ranges of approval between the two specifications.

The differences between EN 287 Pt1 and ISO 9606 Pt1 are that:-

1. the parent metal is no longer an essential variable. The parent materials in EN 287 Pt1 are grouped as in PD CEN ISO/TR 15608, the same as the requirement for welding procedure qualification in ISO 15614 Pt 1. The requirements in ISO 9606 Pt 1 are now similar to those in ASME IX in that, for example, a welder may be qualified to weld stainless steel by using a stainless consumable on a carbon steel test piece. The philosophy behind this approach is that what we are testing here is the welder's ability to use the relevant consumable: the effect of welding on the parent metal is addressed during procedure qualification. The only departure from this is for autogenous welds where the range of approval is that of the parent metal group.
2. the filler metal composition has become an essential variable. Similar compositions are grouped together as FM1, non-alloy and fine grained steels; FM2, high strength steels etc. In addition to the groups covering the steel compositions there is a group FM6, nickel and nickel alloys. Note that ISO9606 Pt1 is to qualify welders for the welding of steels so this group does NOT qualify the welder to weld nickel based alloys but is intended for applications such as dissimilar metal joints between low alloy and austenitic stainless steels. It can also be used to approve a welder to use a high nickel alloy consumable on 9% nickel steels.
3. The range of approval on thickness for butt welds is now based on the deposited weld metal thickness. The parent metal thickness is still the essential variables for fillet welds.
4. In MIG/MAG welding ISO 9606 Pt1 has made metal transfer mode an essential variable - dip transfer qualifies for globular and spray transfer but not vice versa.
5. The requirements with respect to validation of the welder qualification certificate have not been changed but those for prolongation have. The validity of the welder certificate can be confirmed at six monthly periods by the manufacturer as in EN 287 Pt 1. Prolongation, now described as revalidation, can be by:

   i) Retesting the welder at three yearly intervals

   ii) Or the certificate endorsed by the examining body at two yearly intervals provided that :-two test welds have been made and tested within the previous 6 months

   iii) Or the welder is working for the same manufacturer and the manufacturers quality system has been verified in accordance with ISO 3834-2 or ISO 3834-3 and the manufacturer has documented that the welder has produced welds of acceptable quality made in accordance with an application standard.

In the case of options ii) and iii), revalidation must be confirmed by the original certifying authority. It should also be noted that option iii) (method C in ISO 9606-1) may not be acceptable to all purchasers and end users, and fabricators manufacturing equipment under the Pressure Equipment Directive should confirm the applicability of this approach before committing to it.

The test programme specified by EN 287 Pt 1 is essentially unchanged in ISO 9606 Pt 1 although here are some additional requirements. The test methods now reference ISO specifications for visual examination, radiography, bend testing, fracture testing, macro-examination and ultrasonic testing. In a multi-process test piece the situation regarding stop/start positions has been clarified

there must be at least one stop and restart for each process: where macro-sections are substituted for the fracture test of a fillet weld test piece one of the macro-sections must include a stop/start position. To prove that this has been carried out it will therefore be necessary for the test house to record the presence of the stop/start.

This article gives a brief survey of the new specification – it must not be relied upon as being definitive and reference must be made to the specification for accuracy.

Essential Variable	EN 287 Pt1		EN ISO 9606 Pt1		Comments
		clause no		clause no	
welding process	yes	cl 5.2	yes	cl 5.2	
material group	within ISO/TR 15608 Group	Table 2	no		material group is not an essential variable in ISO 9606/1
product type (plate/pipe)	plate qualifies pipe >150mm in PA PB PC	cl 5.3	plate qualifies pipe >75mm in PA PB PC PD	cl 5.3	pipe≥25mm OD qualifies plate in both specs
pipe outside diameter	yes	Table 6	yes	Table 7	
material thickness	butt - yes fillet - yes	Table 5 Table 7	no yes	cl 5.7 and Table 6 Table 8	In ISO 9606/1 the qualified thickness of a butt weld is the deposit thickness
joint type (butt/fillet)	butt does not qualify fillet	cl 5.4	butt does not qualify fillet	cl 5.4 Annex C	fillet weld test supplementing butt test is permitted in both specs
material backing - deletion	yes	Table 9	yes	Table 11	
filler material group	no		yes	cl 5.5	ISO 9606/1 includes 6 separate filler metal groups – see Table 2 and Table 3
filler/autogenous	deletion or addition of filler metal - yes	cl 5.2	addition of filler metal - yes	cl 5.6	In ISO 9606/1 filler additions qualify for autogenous but not vice versa
filler material type (electrode/wire)	solid qualifies cored and vice versa : process 135:138	Table 4	solid qualifies cored and vice versa: process 121, 125 . 135, 138	cl 5.2	ISO 9606 has added submerged arc welding to the qualified processes
filler material coating/core	yes	Table 3 Table 4	yes	Table 4 Table 5	both specs cover coated electrodes and cored wire
weld deposit thickness	butt - yes fillet - no	Table 5	butt – yes fillet - no	Table 6	the parent metal thickness is the essential variable for fillet welds
welding position	yes	cl 5.8 Table 8	yes	cl 5.8 Table 9 Table 10	ISO 9606/1 has separated butt and fillet weld positions into two tables
metal transfer mode	no		yes	cl 5.2	In ISO 9606/1 dip transfer qualifies spray but not vice versa – process 131, 135, 138
single/multi layer	yes – fillet welds only	Table 10	yes – fillet welds only	Table 12	multi-layer qualifies single but not vice versa
acceptance standard	ISO 5817 QL B/C	cl 7	ISO 5817 QL B/C	cl 7	
validity	confirmed at 6 month intervals	cl 9.2	confirmed at 6 month intervals	cl 9.1	
prolongation	every 2 years by examining body	cl 9.3	retest at 3 years OR prolonged every 2 years by examining body OR verified ISO 3834 system	cl 9.2	Method of revalidation must be stated on the certificate at time of initial test