

AS/ISO 9906:2018 Rotodynamic pumps – Hydraulic performance acceptance tests – Grades 1, 2 and 3 is now in effect.

AS 2147:2001 Rotodynamic pumps – hydraulic performance acceptance tests, Grades 1 and 2 with Annex A has been superseded.

This means our new AS/ISO standard is now harmonised with ISO 9906:2012

Also ANSI/HI 14.6:2011 is harmonised with ISO 9906:2012

The outcome from testing to either standard is identical.

Our new standard contains three levels of acceptance criteria for pump performance test results with each grade broken down into subgrades with differing tolerances.

Three levels of acceptance are:

Grade 1B, 1E and 1U with tighter tolerances (old AS2147 grade 1)

Grade 2B and 2U with broader tolerances (old AS2147 grade 2)

Grade 3B with even broader tolerances (old AS2147 annex A)

ISO 9906:2012 specifies; hydraulic performance tests for customers' acceptance of rotodynamic pumps (centrifugal, mixed flow and axial pumps). It is intended to be used for pump acceptance testing at pump test facilities, such as manufacturers' pump test facilities or laboratories. ISO 9906:2012 can be applied to pumps of any size and to any pumped liquids which behave as clean, cold water.

It specifies three levels of acceptance:

- grades 1B, 1E and 1U with tighter tolerance
- grades 2B and 2U with broader tolerance
- grade 3B with even broader tolerance

The Standard applies to a pump itself without any fittings OR to a combination of a pump associated with all or part of its upstream and/or downstream fittings

4.4 Performance test acceptance grades and tolerances

4.4.1 General

Six pump performance test acceptance grades, 1B, 1E, 1U, 2B, 2U and 3B are defined in this subclause. Grade 1 is the most stringent grade, with 1U and 2U having a unilateral tolerance and grades 1B, 2B and 3B having a bilateral tolerance. Grade 1E is also bilateral in nature and is important to those concerned with energy efficiency.

NOTE The grades 1U, 1E and 1B have the same tolerance for flow and head.

The purchaser and manufacturer may agree to use any grade to judge whether or not a specific pump meets a guarantee point. If a guarantee point is given, but no acceptance grade is specified, this standard reverts to a default test acceptance grade, as described in 4.5.

Guarantee point acceptance grades for pump head, flow, power and efficiency are provided in Table 8. All tolerances are percentages of values guaranteed.

Table 8 — Pump test acceptance grades and corresponding tolerance

Grade	1			2		3	Guarantee requirement
T_Q	10 %			16 %		18 %	
T_H	6 %			10 %		14 %	
Acceptance grade	1U	1E	1B	2B	2U	3B	Mandatory
T_Q	+10 %	±5 %		±8 %	+16 %	±9 %	
T_H	+6 %	±3 %		±5 %	+10 %	±7 %	
T_P	+10 %	+4 %		+8 %	+16 %	+9 %	Optional
T_η	≥0 %		-3 %	-5 %		-7 %	
NOTE	$T_x(x = Q, H, P, \eta)$ stands for the tolerance of the indicated quantity.						

- Existing Grade 1, will become Grade 1(B) with revised flow rate tolerance of ±5%
- Series Annex A is now designated as “Grade 3”
- Adding in the 6 x Acceptance grades
- Optional Power “either/or” Efficiency requirements, cannot specify both
- The power and efficiency tolerances are not the result of an exact calculation using the maximum values of the related column. They are instead reflecting real life experiences. For Grade 1U and 1F, no negative tolerance on efficiency is allowed
- Unless agreed upon with the buyer, any other specified duty points are subject to acceptance Grade 3B
- Unilateral Acceptance Grade for a **specified pump** to meet Grade 1U or 2U tolerances, it must meet the specified performance with no negative tolerance permitted

ISO 9906:2012, Default acceptance Grade chart when not defined by the purchaser, Table 9

Default acceptance grade based on purchaser's intended service

Application		Rated shaft power of pump	
		>10 to 100kW (13 to 134 hp)	>100kW (134 hp)
Municipal water and wastewater		2B	1B
Building trades and HVAC		2B	1B
Electric power industry		1B	1B
Oil and gas industry	API pumps	1B	1B
	Pipeline	1B	1B
	Water injection	Not applicable	1B
Chemical industry		2B	2B
Cooling tower		2B	2B
Pulp and paper		2B	2B
Slurry		3B	3B
General industry		3B	2B
Dewatering, drainage and irrigation		3B	2B
Pumps not listed above		3B	2B
Note: This table applies where a guarantee point has been agreed upon, but no tolerance standard has been specified.			

American Standard ANSI/HI 14.6-2011 is in harmony with revised ISO 9906:2012

In summary:

Both Standards are virtually identical in their content

“this means, when users in all parts of the world....when specifying a pump hydraulic performance acceptance test will be working with identical technical requirements and acceptance grades”

HI = Hydraulic Institute

Related Standards:

HI Standard 1.6-2000 withdrawn and considered obsolete

HI Standard 2.6 withdrawn and considered obsolete

ISO 9906:1999 revised and updated to ISO 9906:2012

DIN 1944 obsolete and replaced by ISO 9906:2012

ISO 2548 withdrawn and replaced by ISO 9906:2012

ISO 3555 withdrawn and replaced by ISO 9906:2012

Reference to old AS2147 Standard:

Superseded AS 2417:2001 is a direct text adoption ‘identical’ to ISO 9906:1999

Acceptance Grade	Grade 1	Grade 2	Series Annex A
Flow Rate	±4.5%	±8%	±9%
Head	±3%	±5%	±7%
Power	---	---	+9%
Efficiency	-3%	-5%	-7%

Standard general purpose pumps are to meet tolerance in “Series Annex A”

End

Disclaimer

Offered as a guide only. Every effort has been made to present accurate information.

Always refer to the appropriate Standard for precise requirements.