



Field Service Manual for Proprietary Connections

voestalpine Tubulars
www.vatubulars.com

voestalpine

ONE STEP AHEAD.

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1 voestalpine Tubulars PROPRIETARY CONNECTIONS

voestalpine Tubulars offers two threaded and coupled gas tight Proprietary Connections – designed to meet the requirements of the most demanding customers.

VAGT® – proven by millions of feet in service

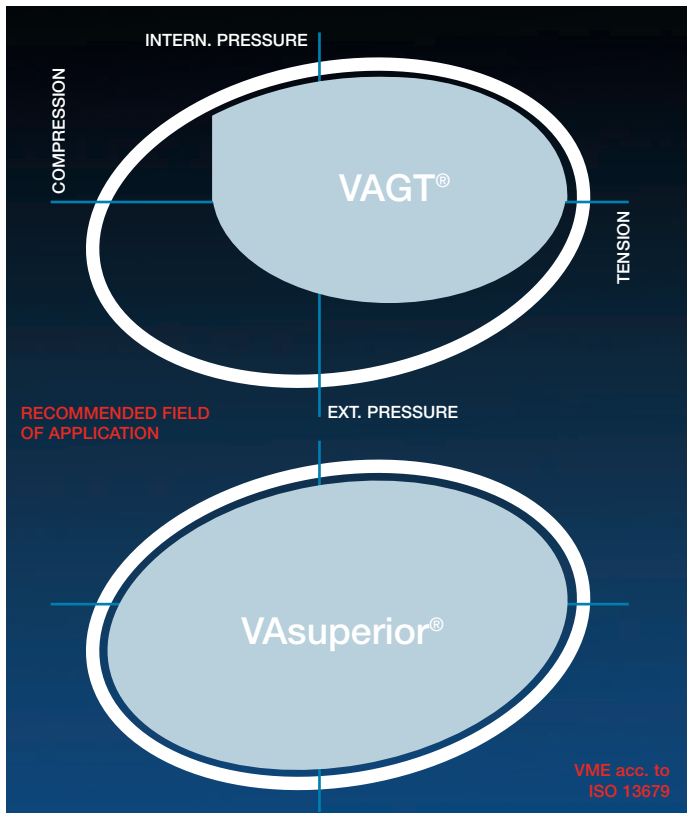
Please see section 4

VAsuperior® – designed to meet ISO13679, CAL IV

Please see section 5

Please note that VAGT® and VAsuperior® are not interchangeable.

Training seminars and field service during the installation can be provided upon request.



2 RUNNING AND HANDLING PROCEDURE

CHECK OF EQUIPMENT



- Check elevator
 - If collar type is used, ensure that bearing face is smooth
 - If slip type is used, ensure that dies are clean and sharp
- Check that the blocks are centered over the rotary table (if not, or heavy wind is expected, a man on the stabbing board can be of great assistance)
- Check size and rating of power tong
 - Nominal size cannot be more than one size larger than the pipe being run
 - Ensure that the tongs are equipped with an accurate and calibrated torque gauge
- Check torque – turn monitoring system
- Check size and condition of back-up tong (the use of pipe wrenches as back-up is not permitted). The back-up-tong shall not be placed on the coupling (except for break-out)

UNLOADING

- Thread protectors in place and not damaged
- Do not place hooks in the end of the pipe
- Avoid rough handling of pipes
- Use proper racks

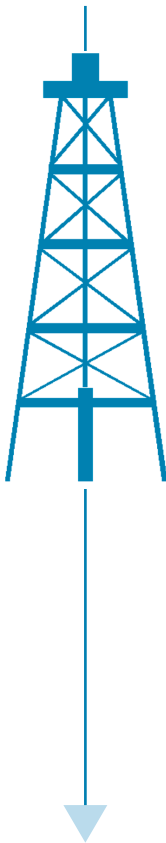
PREPARATION

- Remove pin and box protectors and clean them
- Remove all previous applied thread or storage compound
 - Use proper equipment especially when cleaning the box
 - Use common cleaning solvent. If threads are cleaned with high pressure water jet or steam special care must be taken to prevent corrosion
- Drifting of pipe on the pipe rack should be done before visual inspection (start drift test from box end)



RUNNING

- Inspect all connections visually
 - For evaluation and repair of minor imperfections see section 4.4 for VAGT® & section 5.4 for VAsuperior®
 - If a connection is damaged or questionable, it should be set aside
- Make a pipe tally
- Apply clean and dry thread protectors immediately
- Once the pipe has been pulled into the derrick, remove box thread protector
- Remove pin thread protector just before stabbing
- Clean threads with compressed air
- Check seal area for damages (run a finger over the seal area to detect abnormalities)
- Apply clean thread compound with known friction factor uniformly on pin and box



- Use proper equipment for pin and box
- Don't apply too much dope (the threads should be covered by a uniform thin film including seal and shoulder area)
- Check dope and if necessary re-dope
- When stabbing the joint, lower the pipe slowly and ensure that the connection is aligned before rotating. Maintain alignment during make-up.
- Start make up by hand if possible, two or three turns (a man at the stabbing board and a stabbing guide can be of great assistance)
- If the pipe does not stab correctly or jams, the pin should be removed from the box, both connections shall be cleaned, inspected, re-doped if necessary and re-stabbed
- Once the connection is stabbed and two or three turns are made by hand, power tongs can be used



ACCEPTANCE

- To reduce the risk of galling the assembly speed should be kept below 25 rpm
- Once an increase in torque is noted change to low gear (**VAGT**[®] and **VAsuperior**[®] max. 5 rpm) until final torque is achieved
- The set up torque of the tong should be within the manufacturer's recommended minimum and optimum values (see section 4.3 for **VAGT**[®] & 5.3 for **VAsuperior**[®]) to prevent opening of the mill side during break-out
- Acceptance:
 - Min. 30% (**VAGT**[®]) / Min. 50% (**VAsuperior**[®]) of total applied torque must be on shoulder
 - The final torque must be between the manufacturer's recommended minimum and maximum values (see section 4.3 for **VAGT**[®] and 5.3 for **VAsuperior**[®])
- Take care on already prepared but not used pipes (re-dope, apply thread protectors)



Any problems during make up should be reported immediately, giving details of the make-up (equipment, thread compound, torques used, assembly speed, general conditions...)

STORAGE

It is strongly recommended to occasionally check pipes in storage for corrosion (at least every six months some of the pin and box thread protectors should be removed at random and the threads checked for corrosion).

3 TORQUE-TURN DIAGRAM

1 – Thread Interference

Torque should increase uniformly and slowly. Any interruption or quick increase is an indication of a possible problem (bad stabbing, slipping, bad cleaning,...) → break and re-check

2 – Seal Interference

3 – Shoulder Interference

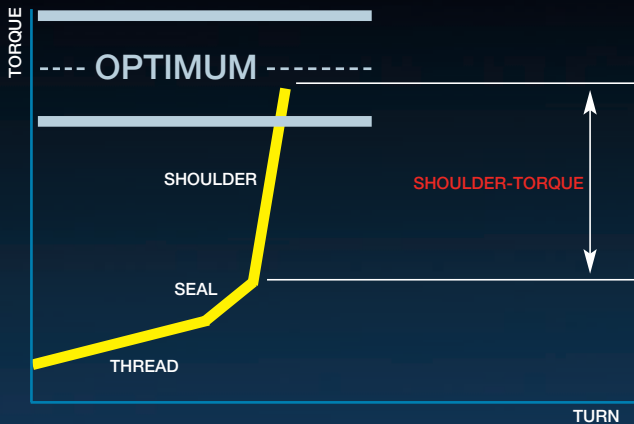
Torque on the shoulder must be at the minimum 30% (VAGT®) / 50% (VAsuperior®) of total applied torque. If the shoulder torque is too low when the total torque is within minimum and maximum, break and re-check (thread torque too high → bad stabbing, cleaning, dope,...). Connection should not be over-torqued. If diagram shows plastic deformation box and pin should be rejected.

FOR FIELD MAKE-UP THE MANUFACTURER RECOMMENDS A FINAL TORQUE BETWEEN MINIMUM AND OPTIMUM VALUES.



Triangle Stamp shall be used as rough indicator for the make-up progress only.

After final make-up the coupling should be close to baseline



VAGT®

MINIMUM 30% SHOULDER-TORQUE

VAsuperior®

MINIMUM 50% SHOULDER-TORQUE

4 VAGT®

**TUBING DESIGN**

1.9 – 4.5 inches

30° seal taper

20° shoulder

1.9" to 2 7/8" 8 threads
per inch3 1/2" to 4 1/2" 6 threads
per inch**CASING DESIGN**

5 – 7 inches

10% seal taper

15° shoulder

5 threads per inch

10° stabbing flank

3° load flank



4.1 GENERAL DESCRIPTION

The proprietary thread connection VAGT® is field approved by millions of successfully installed feet.

METAL TO METAL SEAL – The high contact pressure in the seal area ensures 100 % gas tightness

INTERNAL SHOULDER – Reinforces the contact pressure in the seal area and acts as a positive make-up stop.

IMPROVED BUTTRESS TREAD DESIGN – The thread design ensures a high stress performance and allows easy make-up even under severe conditions.

SMOOTH INTERNAL PROFILE – Minimizes turbulence and also provides good conditions for internal plastic coating.

4.2 DIMENSIONS – VAGT®

Pipe Outside Diameter	Nominal Weight T&C		Wall Thickness		Inside Diameter		Drift Diameter		Coupling Length	
	inch/mm	lb/ft kg/m	inch	mm	inch	mm	inch	mm	inch	mm
1.9"	2.75	4.11	0.145	3.68	1.610	40.89	1.516	38.51	4.016	102.00
48.26	3.65	5.47	0.200	5.08	1.500	38.10	1.406	35.72	4.016	102.00
2 3/8"	4.60	6.69	0.190	4.83	1.995	50.67	1.901	48.29	5.000	127.00
60.32	5.10	7.57	0.218	5.54	1.939	49.25	1.845	46.87	5.000	127.00
	5.80	8.67	0.254	6.45	1.867	47.43	1.774	45.05	5.000	127.00
2 7/8"	6.40	9.29	0.217	5.51	2.441	62.01	2.348	59.63	5.630	143.00
73.02	7.80	11.57	0.276	7.01	2.323	59.01	2.230	56.63	5.630	143.00
	8.60	12.74	0.308	7.82	2.259	57.39	2.166	55.01	5.630	143.00
3 1/2"	7.70	11.28	0.216	5.49	3.068	77.92	2.943	74.74	6.575	167.00
88.90	9.20	13.29	0.254	6.45	2.992	76.00	2.867	72.82	6.575	167.00
	10.20	14.97	0.289	7.34	2.922	74.22	2.797	71.04	6.575	167.00
	12.70	18.90	0.375	9.52	2.750	69.86	2.625	66.68	6.575	167.00
	13.70	20.62	0.413	10.50	2.673	67.90	2.548	64.72	6.575	167.00
	14.70	22.16	0.450	11.43	2.600	66.04	2.475	62.86	6.575	167.00
4"	9.50	13.82	0.226	5.74	3.548	90.12	3.423	86.94	7.126	181.00
101.60	10.70	15.86	0.262	6.65	3.476	88.30	3.351	85.12	7.126	181.00
	13.20	19.63	0.330	8.38	3.340	84.84	3.215	81.66	7.126	181.00
4 1/2"	10.50	15.51	0.224	5.69	4.052	102.92	3.927	99.74	7.913	201.00
114.30	11.60	17.18	0.250	6.35	4.000	101.60	3.875	98.42	7.913	201.00
	12.60	18.50	0.271	6.88	3.958	100.54	3.833	97.36	7.913	201.00
	13.50	19.78	0.290	7.37	3.920	99.56	3.794	96.38	7.913	201.00
	15.20	22.67	0.337	8.56	3.826	97.18	3.701	94.00	7.913	201.00
	17.00	25.37	0.380	9.65	3.740	95.00	3.615	91.82	7.913	201.00
	18.90	28.31	0.430	10.92	3.640	92.46	3.515	89.28	7.913	201.00

All VAGT® accessories are available on request. The shown values are based on T & C pipe lengths of L = 10.0m (32.81ft). Special clearance couplings and 20° beveled couplings have a different performance rating. Please contact

Outside Diameter Coupling				Volume				Length	
Regular		Alternative		Displacement		Production		Make up Loss	
inch	mm	inch	mm	us gal/ft	lit/m	us gal/ft	lit/m	inch	mm
2.201	55.90	2.374	60.30	0.148	1.84	0.106	1.31	1.732	44.0
2.217	56.30	2.374	60.30	0.148	1.84	0.092	1.14	1.732	44.0
2.697	68.50	2.874	73.01	0.231	2.87	0.162	2.02	2.205	56.0
2.697	68.50	2.874	73.01	0.231	2.87	0.153	1.91	2.205	56.0
2.776	70.50	2.874	73.01	0.231	2.87	0.142	1.77	2.205	56.0
3.197	81.20	3.500	88.90	0.338	4.20	0.243	3.02	2.520	64.0
3.327	84.50	3.500	88.90	0.339	4.21	0.220	2.73	2.520	64.0
3.327	84.50	3.500	88.90	0.339	4.21	0.208	2.59	2.520	64.0
4.252	108.00	3.862	98.10	0.502	6.23	0.384	4.77	3.000	76.2
3.862	98.10	4.252	108.00	0.502	6.23	0.365	4.54	3.000	76.2
3.917	99.50	4.252	108.00	0.502	6.23	0.348	4.33	3.000	76.2
4.035	102.50	4.252	108.00	0.503	6.24	0.309	3.83	3.000	76.2
4.138	105.10	4.252	108.00	0.503	6.25	0.292	3.62	3.000	76.2
4.138	105.10	4.252	108.00	0.503	6.25	0.276	3.43	3.000	76.2
4.390	111.50	4.748	120.60	0.655	8.14	0.514	6.38	3.272	83.1
4.390	111.50	4.748	120.60	0.655	8.14	0.493	6.12	3.272	83.1
4.500	114.30	4.748	120.60	0.656	8.15	0.455	5.65	3.272	83.1
4.862	123.50	5.201	132.10	0.829	10.30	0.670	8.32	3.665	93.1
4.862	123.50	5.201	132.10	0.829	10.30	0.653	8.11	3.665	93.1
4.862	123.50	5.201	132.10	0.829	10.30	0.639	7.94	3.665	93.1
4.961	126.00	5.201	132.10	0.830	10.31	0.627	7.79	3.665	93.1
4.961	126.00	5.201	132.10	0.830	10.31	0.597	7.42	3.665	93.1
5.106	129.70	5.252	133.40	0.831	10.32	0.571	7.09	3.665	93.1
5.106	129.70	5.252	133.40	0.831	10.32	0.541	6.71	3.665	93.1

voestalpine Tubulars for details. Special clearance couplings with reduced outside diameters on request. Couplings with alternative outside diameters for casing on request. 20° beveled couplings on request (standard chamfer of 45°).

DIMENSIONS – VAGT®

Pipe Outside Diameter	Nominal Weight T&C		Wall Thickness		Inside Diameter		Drift Diameter		Coupling Length	
	inch/mm	lb/ft kg/m	inch	mm	inch	mm	inch	mm	inch	mm
5" 127.00	13.00	19.67	0.253	6.43	4.494	114.14	4.369	110.96	9.173	233.00
	15.00	22.71	0.296	7.52	4.408	111.96	4.283	108.78	9.173	233.00
	18.00	27.25	0.362	9.19	4.276	108.62	4.151	105.44	9.173	233.00
	21.40	32.30	0.437	11.10	4.125	104.80	4.000	101.62	9.173	233.00
	23.20	34.94	0.478	12.14	4.044	102.72	3.919	99.54	9.173	233.00
	24.10	36.35	0.500	12.70	4.000	101.60	3.875	98.42	9.173	233.00
5 1/2" 139.70	15.50	23.45	0.275	6.98	4.950	125.74	4.825	122.56	9.331	237.00
	17.00	25.73	0.304	7.72	4.892	124.26	4.767	121.08	9.331	237.00
	20.00	30.12	0.361	9.17	4.778	121.36	4.653	118.18	9.331	237.00
	23.00	34.17	0.415	10.54	4.670	118.62	4.545	115.44	9.331	237.00
	26.00	38.65	0.476	12.09	4.548	115.52	4.423	112.34	9.331	237.00
5 3/4" 146.05	16.40	24.95	0.276	7.00	5.199	132.05	5.074	128.87	9.659	245.35
	17.90	27.21	0.303	7.70	5.144	130.65	5.019	127.47	9.659	245.35
	19.70	29.78	0.335	8.50	5.081	129.05	4.956	125.87	9.659	245.35
	20.40	31.40	0.354	9.00	5.039	128.00	4.914	124.82	9.659	245.35
6 5/8" 168.28	20.00	30.11	0.288	7.32	6.050	153.66	5.924	150.48	9.724	247.00
	24.00	36.19	0.352	8.94	5.922	150.42	5.797	147.24	9.724	247.00
	28.00	42.24	0.417	10.59	5.792	147.12	5.667	143.94	9.724	247.00
	32.00	47.52	0.475	12.06	5.676	144.18	5.551	141.00	9.724	247.00
7" 177.80	23.00	34.68	0.317	8.05	6.366	161.70	6.241	158.52	10.118	257.00
	26.00	39.20	0.362	9.19	6.276	159.42	6.151	156.24	10.118	257.00
	29.00	43.77	0.408	10.36	6.184	157.08	6.059	153.90	10.118	257.00
	32.00	48.19	0.453	11.51	6.094	154.78	5.969	151.60	10.118	257.00
	35.00	52.51	0.498	12.65	6.004	152.50	5.879	149.32	10.118	257.00
	38.00	56.50	0.540	13.72	5.920	150.36	5.794	147.18	10.118	257.00

DIMENSIONS – VAGT®

Outside Diameter Coupling				Volume				Length	
Regular		Alternative		Displacement		Production		Make up Loss	
inch	mm	inch	mm	us gal/ft	lit/m	us gal/ft	lit/m	inch	mm
5.563	141.30	-	-	1.026	12.74	0.824	10.23	4.252	108.0
5.563	141.30	-	-	1.026	12.74	0.793	9.85	4.252	108.0
5.563	141.30	-	-	1.026	12.74	0.746	9.27	4.252	108.0
5.563	141.30	-	-	1.026	12.74	0.694	8.63	4.252	108.0
5.563	141.30	-	-	1.026	12.74	0.667	8.29	4.252	108.0
5.563	141.30	-	-	1.026	12.74	0.653	8.11	4.252	108.0
6.051	153.70	-	-	1.240	15.40	1.000	12.42	4.331	110.0
6.051	153.70	-	-	1.240	15.40	0.976	12.13	4.331	110.0
6.051	153.70	-	-	1.240	15.40	0.931	11.57	4.331	110.0
6.051	153.70	-	-	1.240	15.40	0.890	11.05	4.331	110.0
6.051	153.70	-	-	1.240	15.40	0.844	10.48	4.331	110.0
6.535	166.00	-	-	1.359	16.87	1.103	13.70	4.409	112.0
6.535	166.00	-	-	1.359	16.87	1.079	13.41	4.409	112.0
6.535	166.00	-	-	1.359	16.87	1.053	13.08	4.409	112.0
6.535	166.00	-	-	1.358	16.87	1.036	12.87	4.409	112.0
7.390	187.70	-	-	1.802	22.38	1.493	18.54	4.528	115.0
7.390	187.70	-	-	1.802	22.38	1.431	17.77	4.528	115.0
7.390	187.70	-	-	1.802	22.38	1.369	17.00	4.528	115.0
7.390	187.70	-	-	1.802	22.38	1.315	16.33	4.528	115.0
7.657	194.50	-	-	2.009	24.95	1.654	20.54	4.724	120.0
7.657	194.50	-	-	2.009	24.95	1.607	19.96	4.724	120.0
7.657	194.50	-	-	2.009	24.95	1.560	19.38	4.724	120.0
7.657	194.50	-	-	2.009	24.95	1.515	18.82	4.724	120.0
7.657	194.50	-	-	2.009	24.95	1.471	18.27	4.724	120.0
7.657	194.50	-	-	2.009	24.95	1.430	17.76	4.724	120.0

4.3 MAKE UP TORQUE – VAGT®

Pipe Outside Diameter	Nominal Weight	Grade 55	Grade 65	Grade 70	Grade 75
inch/mm	lb/ft	ft.lbs (1 ft.lbs = 1.3558 Nm)			
1,9"	2.75	560	610	630	650
48.26	3.65	710	760	780	810
2 3/8"	4.60	1180	1270	1320	1360
60.32	5.10	1260	1350	1390	1440
	5.80	1510	1620	1670	1730
2 7/8"	6.40	1770	1900	1970	2040
73.02	7.80	2240	2390	2470	2550
	8.60	2330	2490	2560	2640
3 1/2"	7.70	2010	2170	3360	2330
88.90	9.20	2320	2520	2620	2720
	10.20	2600	2820	2930	3030
	12.70	3170	3410	3540	3660
	13.70	3720	4010	4160	4300
	14.70	4140	4490	4670	4840
4"	9.50	2110	2320	2430	2540
101.60	10.70	2540	2820	2950	3090
	13.20	2870	3150	3290	3420
4 1/2"	10.50	3210	3480	3620	3750
114.30	11.60	3590	3910	4070	4230
	12.60	3670	3990	4160	4310
	13.50	4210	4570	4760	4930
	15.20	4410	4770	4950	5130
	17.00	4930	5290	5470	5650
	18.90	5130	5490	5680	5860

Please see remarks on page 24

Grade 80	Grade 85	Grade 90	Grade 95	Grade 110	Grade 125
ft.lbs (1 ft.lbs = 1.3558 Nm)					
670	700	720	740	800	870
830	860	880	910	990	1060
1410	1450	1500	1540	1680	1810
1480	1530	1570	1620	1760	1890
1780	1840	1890	1950	2110	2270
2100	2170	2240	2300	2500	2700
2630	2700	2780	2860	3090	3320
2720	2790	2870	2950	3180	3410
2420	2500	2580	2660	2910	–
2820	2920	3020	3120	3420	3720
3140	3250	3360	3460	3790	4110
3780	3900	4020	4140	4510	4870
4450	4600	4750	4890	5340	5770
5020	5190	5370	5540	4050	6600
2650	2750	2860	2960	3290	3610
3230	3360	3500	3630	4050	4450
3560	3700	3840	3980	4400	4810
3890	4030	4170	4300	4720	5120
4390	4550	4710	4870	5350	5830
4480	4630	4800	4950	5440	5910
5120	5300	5480	5660	6210	6740
5310	5490	5680	5860	6410	6940
5840	6010	6200	6380	6930	7460
6040	6220	6400	6580	7130	7670

MAKE UP TORQUE – VAGT®

Pipe Outside Diameter	Nominal Weight	Grade 55	Grade 65	Grade 70	Grade 75
inch/mm	lb/ft	ft.lbs (1 ft.lbs = 1.3558 Nm)			
5" 127.00	13.00	3980	4310	4470	4630
	15.00	4520	4900	5090	5280
	18.00	5060	5490	5710	5920
	21.40	5900	6440	6710	6980
	23.20	6020	6560	6830	7100
	24.10	6080	6620	6890	7160
5 1/2" 139.70	15.50	4800	5250	5480	5700
	17.00	5420	5950	6220	6490
	20.00	5970	6560	6860	7150
	23.00	6160	6750	7050	7350
	26.00	6340	6940	7240	7530
5 3/4" 146.05	16.40	5820	6310	6560	6810
	17.90	6460	7040	7340	7620
	19.70	6870	7490	7810	8120
	20.40	6990	7680	8020	8360
6 5/8" 168.28	20.00	6570	7250	7590	7920
	24.00	8210	9110	9570	10010
	28.00	8540	9450	9900	10250
	32.00	8800	9700	10160	10510
7" 177.80	23.00	7760	8620	9060	9490
	26.00	8510	9470	9960	10250
	29.00	8720	9680	10170	10460
	32.00	8910	9870	10360	10650
	35.00	9070	10040	10520	10860
	38.00	9210	10180	10610	11140

Please see remarks on page 24

Grade 80	Grade 85	Grade 90	Grade 95	Grade 110	Grade 125
ft.lbs (1 ft.lbs = 1.3558 Nm)					
4800	4960	5130	5290	5780	6260
5480	5670	5860	6050	6630	7200
6140	6350	6570	6780	7440	8070
7250	7510	7780	8050	8870	9660
7370	7630	7900	8170	8980	9780
7430	7690	7960	8230	9040	9840
5930	6150	6380	6600	7290	7950
6760	7030	7300	7560	8380	9170
7460	7750	8050	8340	9240	10120
7620	7940	8240	8530	9440	10310
7830	8120	8420	8720	9620	10500
7060	7300	7550	7790	8540	9270
7920	8210	8500	8790	9670	10530
8430	8740	9060	9370	10320	11240
8710	9050	9400	9730	10780	11800
8270	8600	8940	9270	10300	11300
10310	10500	10690	10890	11470	12020
10450	10650	10860	11040	11650	12220
10700	10890	11070	11260	11830	12380
9870	10300	10730	11000	11730	12260
10550	10850	11140	11390	11940	12500
10750	11040	11330	11580	12130	12680
10940	11220	11510	11750	12310	12830
11210	11380	11630	11870	12390	12900
11380	11510	11750	11920	12480	12980

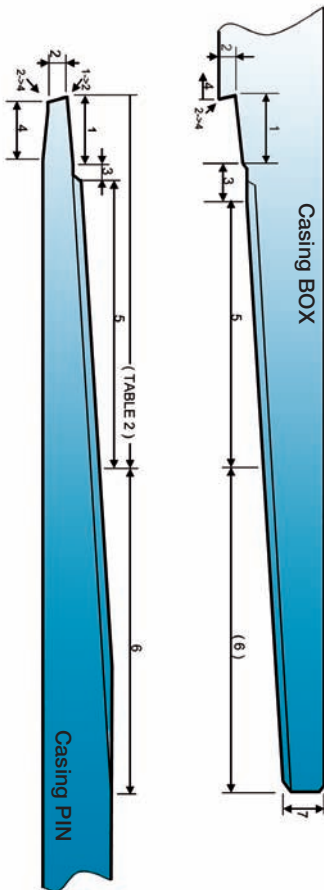
REMARKS TO MAKE-UP TORQUE TABLES

- Recommended make-up torques using a thread compound with a friction factor of 1.0.
- Maximum torque: optimum +15%. Minimum torque: optimum -10%.
- Recommended torques for both regular and alternative couplings are identical.
- Recommended torques for special clearance couplings on request.
- Higher coupling grades: Use recommended torques for the pipe grades.
- Special clearance couplings and 20° beveled couplings have a lower load on coupling face (in this case the use of slip type elevator is strongly recommended).

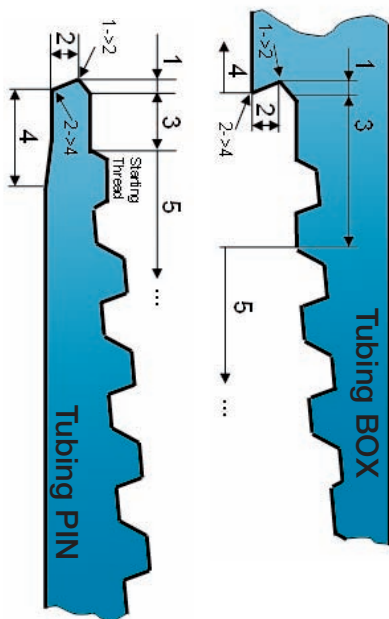


4.4 RECOMMENDED PROCEDURE FOR FIELD REPAIR

HANDLING AND STORAGE IMPERFECTIONS – VAGT®



- 1 Seal
- 2 Shoulder
- 3 Cylindrical Section
- 4 Internal Bore
- 5 Perfect Thread Length
- 6 Non-Perfect Thread Length
- 7 Coupling Face



VAGT® – PIN

Element	Area	Rust	Rust + Pitting
Seal (a*)	1	Remove with abrasive fleece	Re-cut the pin
Shoulder	2	Remove with abrasive fleece	Grind to smooth surface with emery paper
Radius between seal and shoulder	1→2	Remove with abrasive fleece	Grind to smooth surface with emery paper
Edge between shoulder and bore	2→4	N/A	N/A
Cylindrical section	3	Remove with abrasive fleece	Remove rust with abrasive fleece. Pitting is accepted.
Internal bore	4	Accepted	Accepted
Perfect thread length (b*)	5	Remove with abrasive fleece	Grind to smooth surface with emery paper
Non-perfect thread length	6	Remove with abrasive fleece	Grind to smooth surface with emery paper

a* Minor pitting, dents or scratches may be accepted after approval by voestalpine specialist.

b* Up to 2 thread-turns may be imperfect if not more than 1/4 of a turn is affected. If more than 2 thread-turns – or more than a half turn in total – are affected, hand-repair may be accepted after approval by voestalpine specialist.

Burrs	Scratches	Dent
N/A	Minor remove with abrasive fleece	Re-cut the pin
N/A	Grind to smooth surface with emery paper	Grind to smooth surface with file and emery paper
N/A	Grind to smooth surface with emery paper	Grind to smooth surface with file and emery paper
Remove with emery paper	N/A	Grind to smooth surface with file and emery paper
N/A	Accepted	Grind to smooth surface with file and emery paper
N/A	Accepted	Accepted
Remove with emery paper	Accepted	Grind to smooth surface and thread form with file and emery paper
Accepted	Accepted	Grind to smooth surface and thread form with file and emery paper

TABLE 2:

„Perfect Thread Length“ (measured from PIN end)					
PIPE OD	mm	inch	PIPE OD	mm	inch
1.9"	10.2	0.40	5"	50.9	2.00
2 3/8"	20.2	0.80	5 1/2"	52.9	2.08
2 7/8"	27.2	1.07	5 3/4"	54.9	2.16
3 1/2"	36.8	1.45	6 5/8"	58.2	2.29
4"	42.2	1.66	7"	62.9	2.48
4 1/2"	46.6	1.83			

VAGT® – BOX

Element	Area	Rust	Rust + Pitting
Seal (a*)	1	Remove with abrasive fleece	Change coupling
Shoulder (a*)	2	Remove with abrasive fleece	Change coupling
Radius between seal and shoulder	1→2	Remove with abrasive fleece	Change coupling
Edge between shoulder and bore	2→4	N/A	N/A
Cylindrical section	3	Remove with abrasive fleece	Remove rust with abrasive fleece. Pitting is accepted.
Internal bore	4	Accepted	Accepted
Perfect thread length (a*)	5	Remove with abrasive fleece	Change coupling
Non-perfect thread length (b*)	6	Remove with abrasive fleece	Minor pitting, after removal of rust with abrasive fleece, is acceptable
Coupling face	7	Accepted	Accepted

a* Minor pitting, dents or scratches may be accepted after approval by voestalpine specialist.

b* Up to 4 thread-turns may be imperfect if not more than 1/2 of a turn is affected. If more than 4 thread-turns – or more than 2 in total – are affected, hand-repair may be accepted after approval by voestalpine specialist.

Burrs	Scratches	Dent
N/A	Change coupling	Change coupling
N/A	Minor accepted	Change coupling
N/A	Minor accepted	Change coupling
Remove with emery paper	N/A	Change coupling
N/A	Accepted	Change coupling
N/A	Accepted	Accepted
Remove with emery paper	Accepted	Change coupling
Minor accepted	Accepted	Grind to smooth surface and thread form with file and emery paper
Accepted	Accepted	Accepted

General:

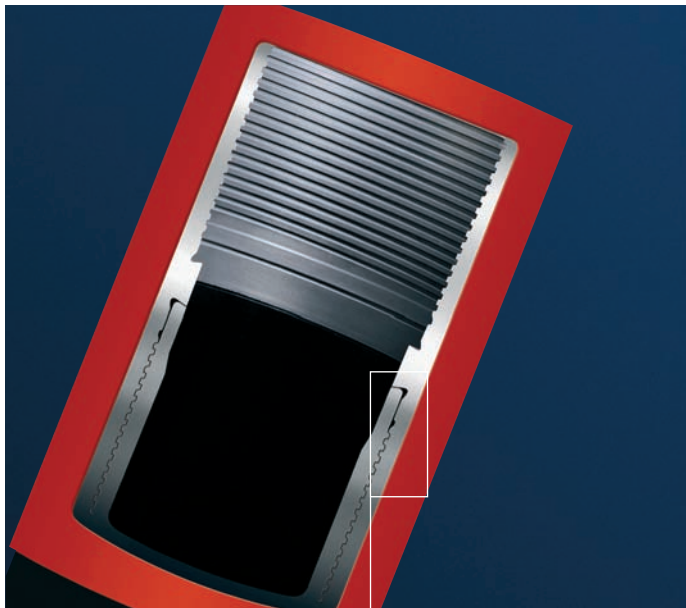
The phosphated surface shall not be removed by hand-repair (except area 3, 4 and 7). If removed, it can be accepted after approval by voestalpine specialist and application of phosphate spray.

It is also recommended that after repair a Moly-disulfide spray should be applied (PIN & BOX).

Abrasive fleece: 400 / 500 (superfine)

Emery paper: 300 - 400 (superfine)

5 VAsuperior®



CASING DESIGN
 10% seal taper
 15° shoulder
 5 threads per inch
 10° stabbing flank
 3° load flank

5.1 GENERAL DESCRIPTION

The proprietary thread connection VAsuperior® is designed to meet the toughest conditions.

METAL TO METAL SEAL – The optimal contact pressure in the seal area ensures 100% gas tightness.

INTERNAL SHOULDER – Reinforces the contact pressure in the seal area and is acting as a positive make-up stop.

OPTIMIZED BUTTRESS THREAD DESIGN – The thread design allows easy and fast make-up in the most severe conditions.

SMOOTH INTERNAL PROFILE – The internal flush profile minimizes turbulences.

POSITION OF SEAL AREA – The distance from the pin face provides improved protection against transport, handling and – almost all – installation damages.

CLEARANCE – The recess before and after the seal area is a lubricant reservoir where excess thread compound is forced to prevent a pressure build up due to trapped and compressed thread compound.

5.2 DIMENSIONS – VAsuperior®

Pipe Outside Diameter inch/mm	Nominal Weight		Wall Thickness		Inside Diameter		Drift Diameter	
	lb/ft	kg/m	inch	mm	inch	mm	inch	mm
5" 127.00	13.00	19.67	0.253	6.43	4.494	114.14	4.369	110.96
	15.00	22.71	0.296	7.52	4.408	111.96	4.283	108.78
	18.00	27.25	0.362	9.19	4.276	108.62	4.151	105.44
	21.40	32.30	0.437	11.10	4.125	104.80	4.000	101.62
	23.20	34.94	0.478	12.14	4.044	102.72	3.919	99.54
	24.10	36.35	0.500	12.70	4.000	101.60	3.875	98.42
5 1/2" 139.70	15.50	23.45	0.275	6.98	4.950	125.74	4.825	122.56
	17.00	25.73	0.304	7.72	4.892	124.26	4.767	121.08
	20.00	30.12	0.361	9.17	4.778	121.36	4.653	118.18
	23.00	34.17	0.415	10.54	4.670	118.62	4.545	115.44
	26.00	38.65	0.476	12.09	4.548	115.52	4.423	112.34
5 3/4" 146.05	16.40	24.95	0.276	7.00	5.199	132.05	5.074	128.87
	17.90	27.21	0.303	7.70	5.144	130.65	5.019	127.47
	19.70	29.78	0.335	8.50	5.081	129.05	4.956	125.87
6 5/8" 168.30	20.40	31.40	0.354	9.00	5.041	128.05	4.916	124.87
	20.00	30.11	0.288	7.32	6.050	153.66	5.924	150.48
	24.00	36.19	0.352	8.94	5.922	150.42	5.797	147.24
	28.00	42.24	0.417	10.59	5.792	147.12	5.667	143.94
	32.00	47.52	0.475	12.06	5.676	144.18	5.551	141.00
7" 177.80	23.00	34.68	0.317	8.05	6.366	161.70	6.241	158.52
	26.00	39.20	0.362	9.19	6.276	159.42	6.151	156.24
	29.00	43.77	0.408	10.36	6.184	157.08	6.059	153.90
	32.00	48.19	0.453	11.51	6.094	154.78	5.969	151.60
	35.00	52.51	0.498	12.65	6.004	152.50	5.879	149.32

All VAsuperior® accessories are available on request. The values shown are based on T&C pipe lengths of L = 10.0m (32.81ft). Special clearance couplings with reduced outside diameters are available on request.

Coupling Length		Outside Diameter Coupling		Volume				Length	
				Displacement		Production		Make up Loss	
inch	mm	inch	mm	us gal/ft	lit/m	us gal/ft	lit/m	inch	mm
9.685	246.00	5.563	141.30	1.026	12.74	0.824	10.23	4.246	107.86
9.685	246.00	5.563	141.30	1.026	12.74	0.793	9.85	4.246	107.86
9.685	246.00	5.563	141.30	1.026	12.74	0.746	9.27	4.246	107.86
9.685	246.00	5.748	146.00	1.028	12.77	0.694	8.63	4.246	107.86
9.685	246.00	5.748	146.00	1.028	12.77	0.667	8.29	4.246	107.86
9.685	246.00	5.748	146.00	1.028	12.77	0.653	8.11	4.246	107.86
9.843	250.00	6.051	153.70	1.241	15.41	1.000	12.42	4.313	109.56
9.843	250.00	6.051	153.70	1.241	15.41	0.976	12.13	4.313	109.56
9.843	250.00	6.051	153.70	1.241	15.41	0.931	11.57	4.313	109.56
9.843	250.00	6.260	159.00	1.243	15.44	0.890	11.05	4.313	109.56
9.843	250.00	6.260	159.00	1.243	15.44	0.844	10.48	4.313	109.56
10.000	254.00	6.260	159.00	1.355	16.83	1.103	13.70	4.392	111.56
10.000	254.00	6.260	159.00	1.355	16.83	1.079	13.41	4.392	111.56
10.000	254.00	6.299	160.00	1.356	16.84	1.053	13.08	4.392	111.56
10.000	254.00	6.299	160.00	1.356	16.84	1.037	12.88	4.392	111.56
10.236	260.00	7.157	181.80	1.799	22.34	1.493	18.54	4.510	114.56
10.236	260.00	7.390	187.70	1.803	22.39	1.431	17.77	4.510	114.56
10.236	260.00	7.390	187.70	1.803	22.39	1.369	17.00	4.510	114.56
10.236	260.00	7.390	187.70	1.803	22.39	1.315	16.33	4.510	114.56
10.630	270.00	7.657	194.50	2.010	24.96	1.654	20.54	4.707	119.56
10.630	270.00	7.657	194.50	2.010	24.96	1.607	19.96	4.707	119.56
10.630	270.00	7.657	194.50	2.010	24.96	1.560	19.38	4.707	119.56
10.630	270.00	7.795	198.00	2.012	24.99	1.515	18.82	4.707	119.56
10.630	270.00	7.795	198.00	2.012	24.99	1.471	18.27	4.707	119.56

Blanking dimensions for accessories are available as a download on our web page www.vatubulars.com

5.3 MAKE UP TORQUE – VAsuperior®

Pipe Outside Diameter	Nominal Weight	Grade 55	Grade 65	Grade 70	Grade 75
inch/mm	lb/ft	ft.lbs (1 ft.lbs = 1.3558 Nm)			
5" 127.00	13.00	4160	4510	4670	4840
	15.00	4730	5130	5320	5520
	18.00	5290	5740	5970	6190
	21.40	6170	6740	7020	7300
	23.20	6290	6850	7140	7430
	24.10	6350	6920	7200	7480
5 1/2" 139.70	15.50	5020	5490	5730	5960
	17.00	5660	6220	6500	6780
	20.00	6250	6850	7170	7470
	23.00	6440	7050	7370	7680
	26.00	6630	7250	7570	7870
5 3/4" 146.05	16.40	6080	6600	6850	7120
	17.90	6750	7360	7670	7960
	19.70	7180	7830	8160	8490
	20.40	7310	8030	8380	8740
6 5/8" 168.28	20.00	6870	7580	7940	8280
	24.00	8580	9530	10010	10460
	28.00	8930	9880	10350	10820
	32.00	9200	10150	10620	11090
7" 177.80	23.00	8110	9010	9470	9920
	26.00	8900	9900	10410	10900
	29.00	9120	10120	10640	11130
	32.00	9320	10320	10830	11320
	35.00	9480	10500	11000	11500

Please see remarks on page 38

Grade 80	Grade 85	Grade 90	Grade 95	Grade 110	Grade 125
ft.lbs (1 ft.lbs = 1.3558 Nm)					
5020	5180	5360	5530	6050	6550
5730	5930	6130	6330	6930	7530
6420	6640	6870	7090	7780	8440
7580	7850	8140	8420	9270	10100
7710	7970	8260	8550	9390	10230
7760	8040	8320	8600	9450	10290
6200	6430	6670	6900	7620	8310
7060	7350	7640	7900	8760	9590
7800	8100	8420	8720	9660	10580
7960	8300	8620	8920	9870	10780
8180	8490	8800	9120	10050	10980
7380	7640	7890	8150	8930	9690
8280	8580	8890	9190	10110	11010
8810	9140	9470	9800	10790	11750
9110	9460	9830	10170	11270	12340
8650	8990	9350	9690	10770	11820
10950	11420	11890	12350	13790	15190
11300	11760	12250	12700	14150	15540
11560	12040	12520	12970	14420	15810
10380	10830	11280	11730	13110	14450
11420	11910	12420	12910	14440	15920
11640	12130	12640	13150	14660	16150
11840	12330	12840	13330	14850	16340
12000	12500	13010	13510	15040	16520

REMARKS TO MAKE-UP TORQUE TABLES

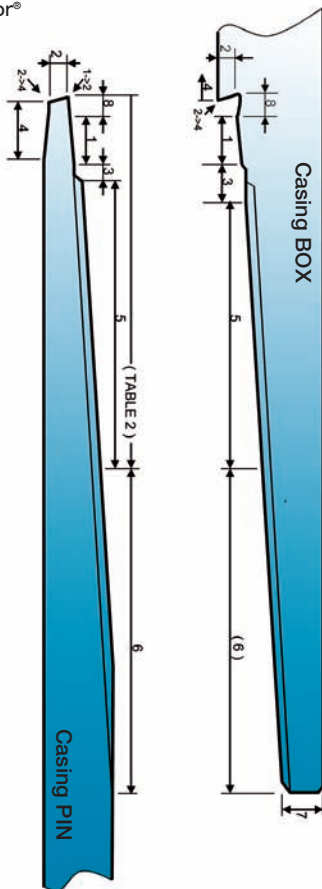
- Recommended make-up torques using a thread compound with a friction factor of 1.0
- Maximum torque: optimum +10%
- Minimum torque: optimum -10%
- Special clearance couplings and 20° beveled couplings have a lower load on coupling face (in this case the use of a slip type elevator is strongly recommended).



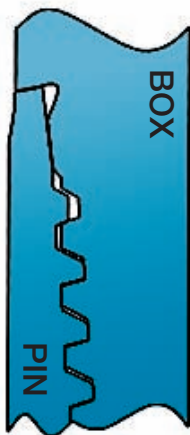
5.4 RECOMMENDED PROCEDURE FOR FIELD REPAIR

HANDLING AND STORAGE IMPERFECTIONS

VAsuperior®



- 1 Seal
- 2 Shoulder
- 3 Cylindrical Section
- 4 Internal Bore
- 5 Perfect Thread Length
- 6 Non-Perfect Thread Length
- 7 Coupling Face
- 8 Clearance



VAsuperior® – PIN

Element	Area	Rust	Rust + Pitting
Seal (a*)	1	Remove with abrasive fleece	Re-cut the pin
Shoulder	2	Remove with abrasive fleece	Grind to smooth surface with emery paper
Radius between clearance area and shoulder	1→2	Remove with abrasive fleece	Grind to smooth surface with emery paper
Edge between shoulder and bore	2→4	N/A	N/A
Cylindrical section	3	Remove with abrasive fleece	Remove rust with abrasive fleece. Pitting is accepted
Internal bore	4	Accepted	Accepted
Perfect thread length (b*)	5	Remove with abrasive fleece	Grind to smooth surface with emery paper
Non-perfect thread length	6	Remove with abrasive fleece	Grind to smooth surface with emery paper
Clearance area	8	Remove with abrasive fleece	Remove rust with abrasive fleece. Pitting is accepted

a* Minor pitting, dents or scratches may be accepted after approval by voestalpine specialist.

b* Up to 2 thread-turns may be imperfect if not more than 1/4 of a turn is affected. If more than 2 thread-turns – or more than a half turn in total – are affected, hand-repair may be accepted after approval by voestalpine specialist.

Burrs	Scratches	Dent
N/A	Minor remove with abrasive fleece	Re-cut the pin
N/A	Grind to smooth surface with emery paper	Grind to smooth surface with file and emery paper
N/A	Grind to smooth surface with emery paper	Grind to smooth surface with file and emery paper
Remove with emery paper	N/A	Grind to smooth surface with file and emery paper
N/A	Accepted	Grind to smooth surface with file and emery paper
N/A	Accepted	Accepted
Remove with emery paper	Accepted	Grind to smooth surface and thread form with file and emery paper
Accepted	Accepted	Grind to smooth surface and thread form with file and emery paper
N/A	Accepted	Grind to smooth surface with file and emery paper

TABLE 2:

„Perfect Thread Length“ (measured from PIN end)					
PIPE OD	mm	inch	PIPE OD	mm	inch
5"	50.9	2.00	6 5/8"	58.2	2.29
5 1/2"	52.9	2.08	7"	62.9	2.48
5 3/4"	54.9	2.16			

VAsuperior® – BOX

Element	Area	Rust	Rust + Pitting
Seal (a*)	1	Remove with abrasive fleece	Change coupling
Shoulder (a*)	2	Remove with abrasive fleece	Change coupling
Radius between seal and shoulder	1→2	Remove with abrasive fleece	Change coupling
Edge between shoulder and bore	2→4	N/A	N/A
Cylindrical section	3	Remove with abrasive fleece	Remove rust with abrasive fleece. Pitting is accepted
Internal bore	4	Accepted	Accepted
Perfect thread length (a*)	5	Remove with abrasive fleece	Change coupling
Non-perfect thread length (b*)	6	Remove with abrasive fleece	Minor pitting, after removal of rust with abrasive fleece, is accepted
Coupling face	7	Accepted	Accepted
Clearance	8	Accepted	Accepted

a* Minor pitting, dents or scratches may be accepted after approval by voestalpine specialist.

b* Up to 4 thread-turns may be imperfect if not more than 1/2 of a turn is affected. If more than 4 thread-turns – or more than 2 in total – are affected, hand-repair may be accepted after approval by voestalpine specialist.

Burrs	Scratches	Dent
N/A	Change coupling	Change coupling
N/A	Minor accepted	Change coupling
N/A	Minor accepted	Change coupling
Remove with sand paper	N/A	Change coupling
N/A	Accepted	Change coupling
N/A	Accepted	Accepted
Remove with emery paper	Accepted	Change coupling
Minor accepted	Accepted	Grind to smooth surface and thread form with file and emery paper
Accepted	Accepted	Accepted
Accepted	Accepted	Accepted

General:

The phosphated surface shall not be removed by hand-repair (except area 3, 4 and 7). If removed, it can be accepted after approval by voestalpine specialist and application of phosphate spray. It is also recommended that after repair a Moly-disulfide spray should be applied (PIN & BOX).

Abrasive fleece: 400 / 500 (superfine)

Emery paper: 300 - 400 (superfine)

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