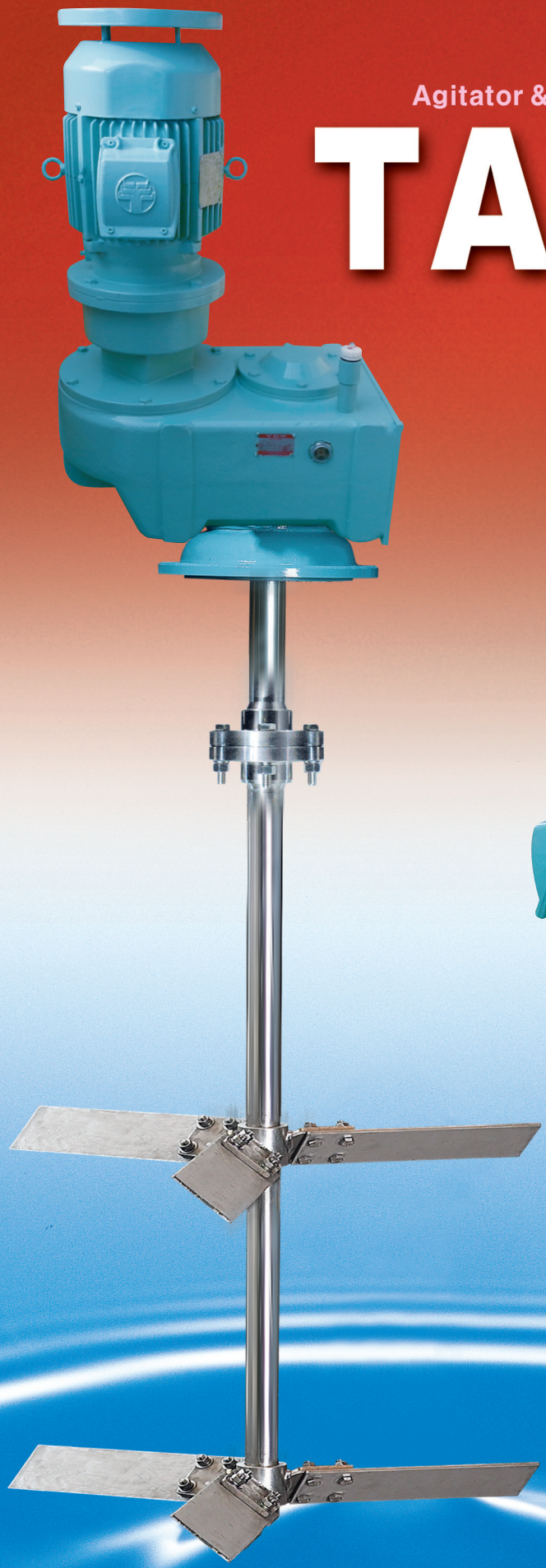
Agitator & Reducer Professional manufacturers

TAE WOO

AGITATOR



KS Q ISO 9001:2009 / Cert No. 3015

TAE WOO MACHINERY CO.,LTD.

회사연혁 COMPANY HISTORY

일자	내용	비고
1978. 10. 20	태우기계산업공사 설립, 감속기주물제작.	
1979. 09.	서울시 영등포구 양평동 2가 43-11. 확장이전.	
1984. 03.	CYCLO REDUCER 국산화 개발, 주문제작	
1985. 12.	상공부지정 감속기 전문업체 등록.	
1988. 11.	CYCLO REDUCER 및 AGITATOR외 7건 상표등록.	특허청
1990. 09.	국민은행 지정 유망중소기업으로 선정.	
1991. 05.	태우기계주식회사 법인 변경.	
1992. 04.	서울시 구로구 온수동 100-20. 온수산업단지 확장 이전.	
2000. 06.	ISO 9002 품질시스템 인증획득.	능률협회
2000. 10.	탈황본설비 AGITATOR 국내최초 국산화 성공.	
2001. 05.	서울시기계공업협동조합가입.	
2002. 07.	한전정비적격업체 인증.	
2003. 01.	탈황설비 대용량 국내최초 한전승인 국산화 성공.	
2003. 06.	ISO 9001:2000 인증.	능률협회
2004. 08.	대우감속기와 합병으로 생산품목 다양화 (GEARED MOTOR(H,V TYPE)침전조용감속기 및 교반기, GEAR BOX , LINE POWER 기타 특수사양)	
2005. 07. 08	정비적격업체 인증(한국서부발전)	
2006. 02. 01	정비적격업체 인증(동서발전)	
2008. 02. 29	대표이사 변경(안방환에서 김기수)	
2009. 02. 24	특허증(교반기의 축 지지장치)	특허청장
2009. 04. 16	특허증(교반기)	특허청장
2012. 02. 23	신뢰성 인증서(교반기용 감속기-헤리컬기어 타입)	한국기계
2012. 03. 13	CE 인증서	
2012. 03. 28	연구개발전담부서 인정서	한국산업
2012. 06. 22	품질경영체제인증서 ISO 9001:2009 인증.	한국경총
2012. 06. 29	정비적격업체 인증서(한국동서발전)	한국동서발전
2012. 07. 18	기술혁신형 중소기업 확인서	중소기업청

Date	History	Remarks
1978. 10. 20	Taewoo Mechanical Industries established to manufacture forced parts for reducers.	
1979. 09.	Moved to 43-11 Yangpyeong-dong 2-ga Yeongdeungpo-gu, Seoul.	
1984. 03.	Localized CYCLO REDUCER for customized manufacture.	
1985. 12.	Registered as specialized reducer manufacturer as the Ministry of Commerce, Industry, and Energy.	
1988. 11.	Registered seven trademarks, including CYCLO REDUCER and AGITATOR.	Korean Intellectual Property Office
1990. 09.	Selected as promising small/medium company by Kookmin Bank.	
1991. 05.	Converted to corporation: Taewoo Mechanical Co., Ltd.	
1992. 04.	Moved to Onsu Industrial Complex at 100-20 Onsu-dong Guro-gu, Seoul.	
2000. 06.	Obtained the ISO 9002 Quality System Certification.	Korea Management Association
2000. 10.	Succeeded in localizing desulfurizing AGITATOR first time in Korea.	
2001. 05.	Joined Seoul Mechanical Industrial Cooperatives.	
2002. 07.	Certified as qualified maintenance service provider for the Korea Electric Power Corporation.	
2003. 01.	Suceeded in localizing large-capacity desulfurizer certified by the Korea Electric Power Corporation.	
2003. 06.	Obtained the ISO 9001:2000 Certification.	Korea Management Association
2004. 08.	Merged with Daewoo Reducer to diversify product lineup. (GEARED MOTOR (H,V TYPE) Reducer and Agitator for Precipitation Tank, GEAR BOX , LINE POWER, other special specifications)	
2005. 07. 08	Certified as qualified maintenance service provider (Korea Seobu Power Generation)	
2006. 02. 01	Certified as qualified maintenance service provider (Dongseo Power Generation)	
2008. 02. 29	New CEO appointed (from Bang Hwan Ahn to Ki Soo Kim)	
2009. 02. 24	Certificate of Patent (Hollow Shaft and Drive Shaft of Agitator)	Korea Intellectual Property Office
2009. 04. 16	Certificate of Patent (Assembly Rubber Lining of Agitator)	Korea Intellectual Property Office
2012. 02. 23	Certificate of Reliability (Reducer for Agitator)	KIMM
2012. 03. 13	EC Declaration of Conformity (Agitator)	
2012. 03. 28	Certificate of Reserch and Development Part	KOITA
2012. 06. 22	Obtained the KS Q ISO 9001 : 2009 / ISO 9001 : 2008	
2012. 06. 29	Certified as qualified maintenance service provider (Dongseo Power Generation)	
2012. 07. 18	Confirmation Of Innovation Business	

SELECTING AGITATOR

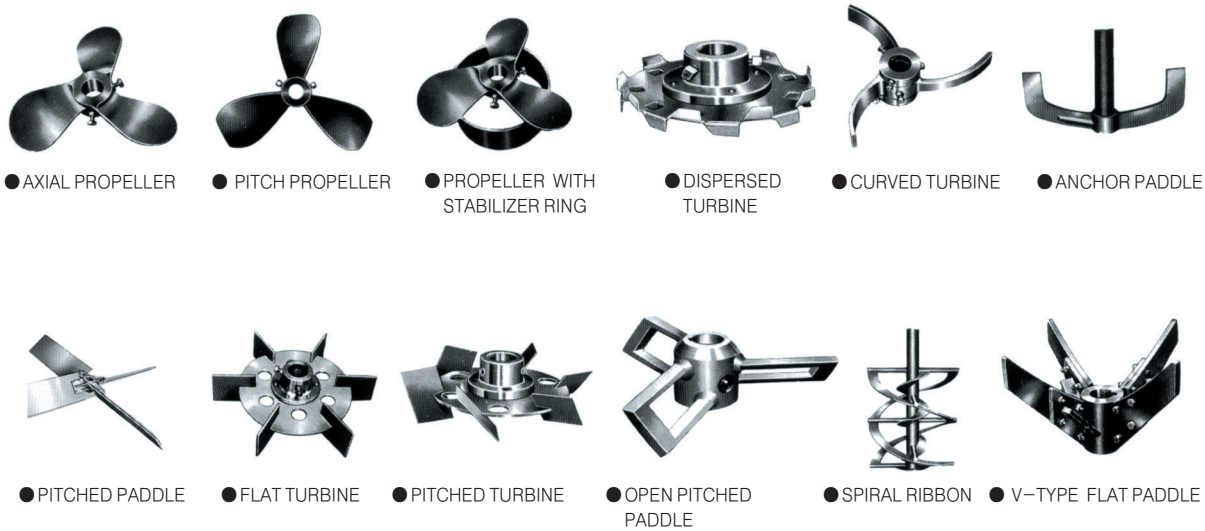
■ Types of stirrer and selecting RPM

The types of stirrer can be categorized as chemical dissolving tank, neutralizing tank, and Flocculation Tank, and the selection standards are as follows, the RPM usage by each stir tank varying by the liquid to be stirred.

- ■ Chemical dissolving tank : 360RPM, 240RPM, 180RPM
- ■ Neutralizing tank : 180RPM, 120RPM
- ■ Flocculation Tank : 90RPM, 60RPM

■ Types of Impellers and Application Methods

1. Types of Impellers



2. Application and Leading Edge Speed Range

● Usage range of impellers

Di/Dt	PADDLE	TURBINE	PROPELLER
0.15~0.3	9%	10%	23%
0.3~0.5	22%	65%	54%
0.5~0.9	0.5~0.75 : 47% 0.9 : 22%	25%	23%

● Range of leading edge speed Vt

Vt	PADDLE	TURBINE	PROPELLER
2m/sec	24%	36%	24%
2~5m/sec	52%	42%	58%
5~8m/sec	24%	21%	18%

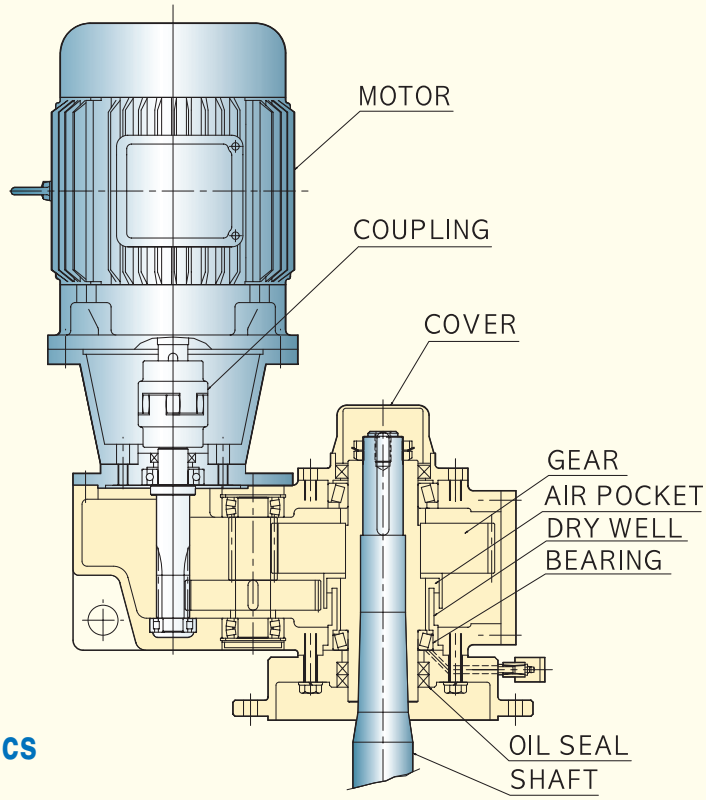
* Impeller's DIA and RPM may be adjusted to suit the needs and types of liquid to be stirred.

THFA-○○○ TYPE 중 · 저속 장축용 다목적 교반기

특 징 /Characteristics

- 교반목적에 따라 HYDROFOIL & PADDLE IMPELLER를 다양하게 효율적으로 선택하여 사용할 수 있으며, HOLLOW SHAFT로 제작되어 경량화 및 안정성을 높였습니다.
- 교반조내 유속을 안정화 하면서 효율이 높아야되는 무산소조, 저류조, 혐기조등에 적합하여 폐수처리장의 저류조, 반응조, 응집조용으로 적합합니다.
- DRY-WELL구조로 제작되어 누유에 대한 원인을 완전 차단하였습니다.
- HOLLOW SHAFT를 TAPER 가공하고, TAPER ROLLER BEARING을 사용하여, DRIVE SHAFT 상부에 나사를 내고 LOCK NUT & WASHER로 조여 교반기 운전시 SHAFT진동을 극소화 하였습니다.
- GEAR BOX와 MOTORRK 일체가 아닌 분리형으로 설계되었고 DRIVE SHAFT도 TAPER가공되어 유지보수 및 관리에 편리하게 하였습니다.

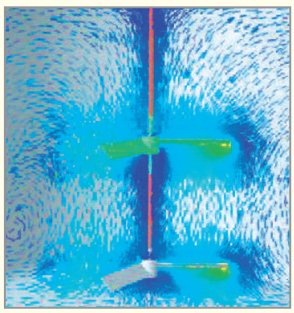
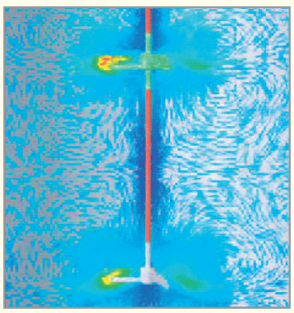
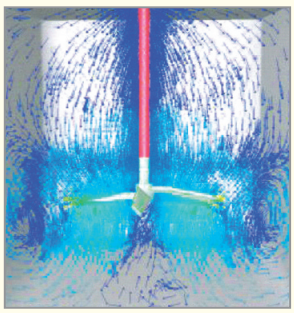
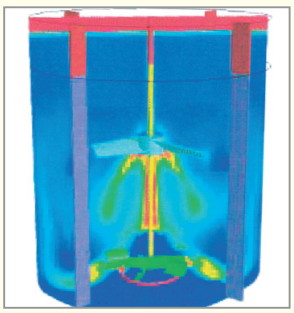
DRY-WELL 내부구조 / DRY-WELL Interior Structure



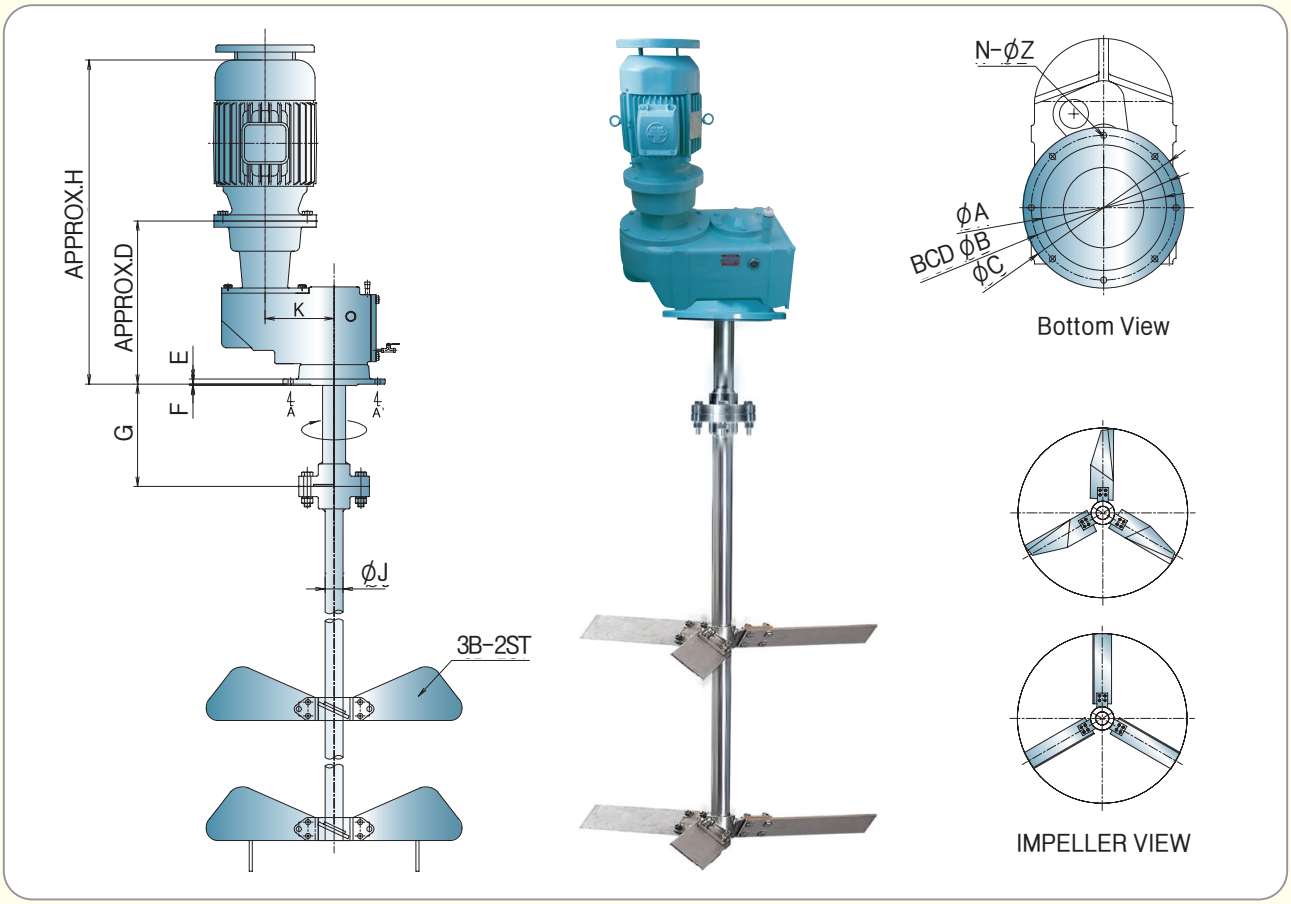
THFA-OOO TYPE Mid/Low-speed Long-Shaft Multipurpose Agitator Characteristics

- You may choose from HYDROFOIL & PADDLE IMPELLER according to the purpose of agitation and the HOLLOW SHAFT makes the unit lightweight and stable.
- It is suitable for anoxic reactor, storage tank, and anaerobic tank that require high efficiency while stabilizing the speed of flow in the agitated vessel. Great for storage tanks, reactor tanks, and flocculation tanks of wastewater treatment plants.
- DRY-WELL structure is completely free of leakage.
- HOLLOW SHAFT is tapered and TAPER ROLLER BEARING is used to bore the top of DRIVE SHAFT and fasten the unit with LOCK NUTS & WASHERS. This minimizes the vibration of shaft while the agitator is operated.
- GEAR BOX and MOTORRK are separated and DRIVE SHAFT is tapered for more convenient repair and maintenance.

시뮬레이션 / Simulation

TSFA TYPE



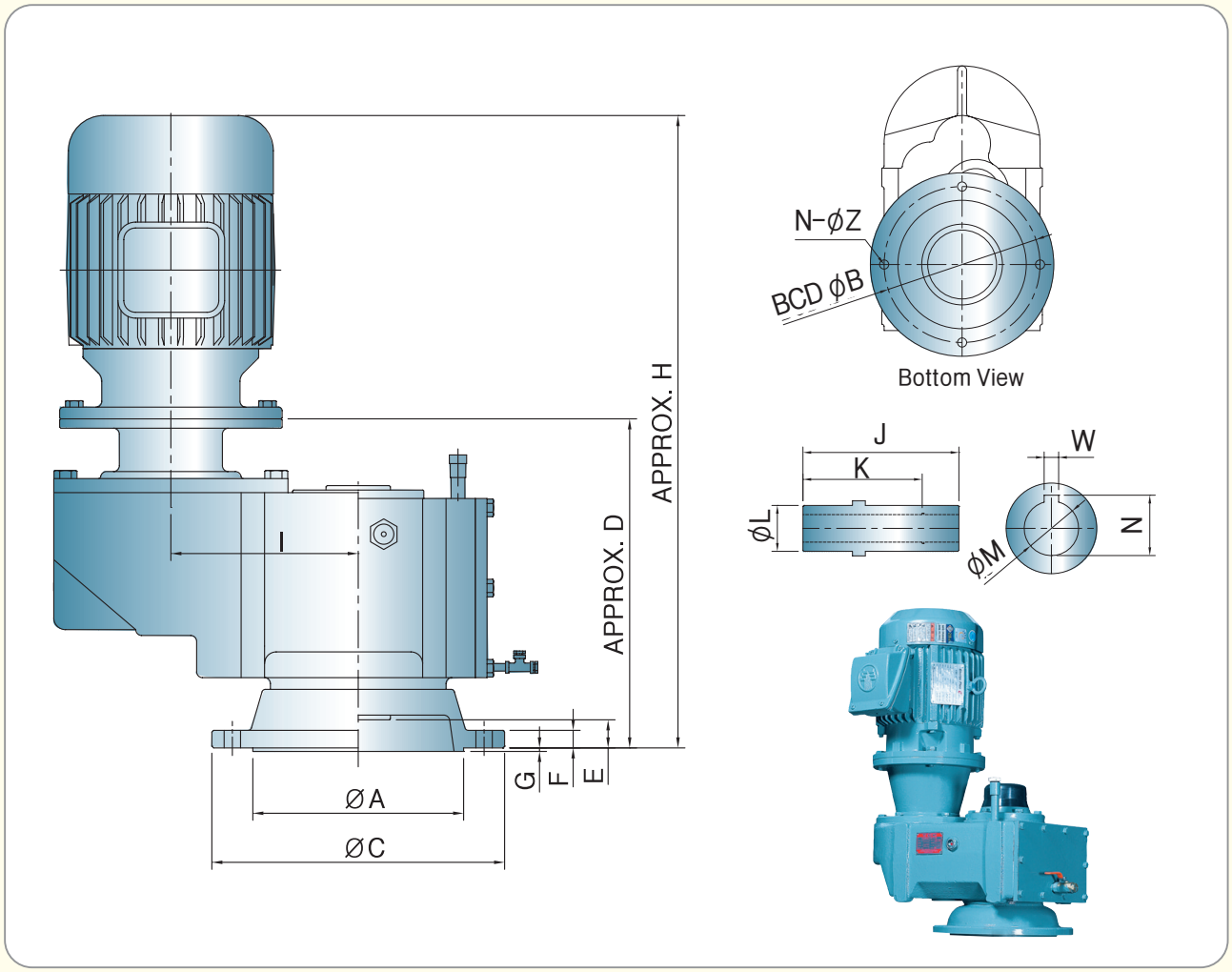
DIMENSION

(Unit : mm)

MODEL	A	B	C	D	E	F	G	H	J	K	N- ø Z
TSFA-035	ø 140	ø 170	ø 200	278	10	3	300	560	ø 30 - ø 35	135	4- ø 10
TSFA-055	ø 180	ø 215	ø 250	342	15	4	300	710	ø 40 - ø 45	160	4- ø 14
TSFA-065	ø 230	ø 265	ø 300	380	16	4	300	730	ø 40 - ø 50	185	6- ø 15
TSFA-075	ø 230	ø 265	ø 300	432	16	4	400	865	ø 50 - ø 60	213	6- ø 15
TSFA-085	ø 250	ø 300	ø 350	512	18	5	400	980	ø 65 - ø 70	270	6- ø 19
TSFA-095	ø 350	ø 400	ø 450	560	22	5	500	1025	ø 75 - ø 85	295	8- ø 19
TSFA-105	ø 400	ø 450	ø 500	618	25	5	500	1165	ø 90 - ø 100	330	8- ø 19
TSFA-125	ø 500	ø 550	ø 600	458	25	5	600	1300	ø 105 - ø 110	393	12- ø 23
TSFA-155	ø 600	ø 650	ø 700	516	30	6	600	1500	ø 120 - ø 130	403	12- ø 23
TSFA-175	ø 680	ø 740	ø 800	840	40	6	600	1500	ø 140 - ø 160	480	10- ø 33
TSFA-195	ø 750	ø 825	ø 900	970	45	7	600	1500	ø 170 - ø 180	620	12- ø 33
TSFA-215	ø 850	ø 925	ø 1000	1030	50	8	600	1500	ø 190 - ø 210	740	12- ø 33

1) Motor 극수는 4P 기준임.(Motor : Stands for 4poles.)
2) Approx.D,H : 동력에 따라서 치수 변경.(Approx.D,H : Dimension depending on the power are change.)
3) Mixing shaft&Impeller 조립볼트 체결시 Tarque값 참조.(P.12).
(Mixing shaft&Impeller assemble see the Standard torque table.) (P.12)
4) Mixing shaft&Impeller는 용도에 따라 변경될 수 있음.
(Mixing shaft&Impeller depending on the purpose of agitator are change.)
5) 설계반영에 따라 사이즈 변경 및 제외가능.(Changes and excluding possible depending on the design.)

● THFA TYPE(중공축/Hollow Shaft)



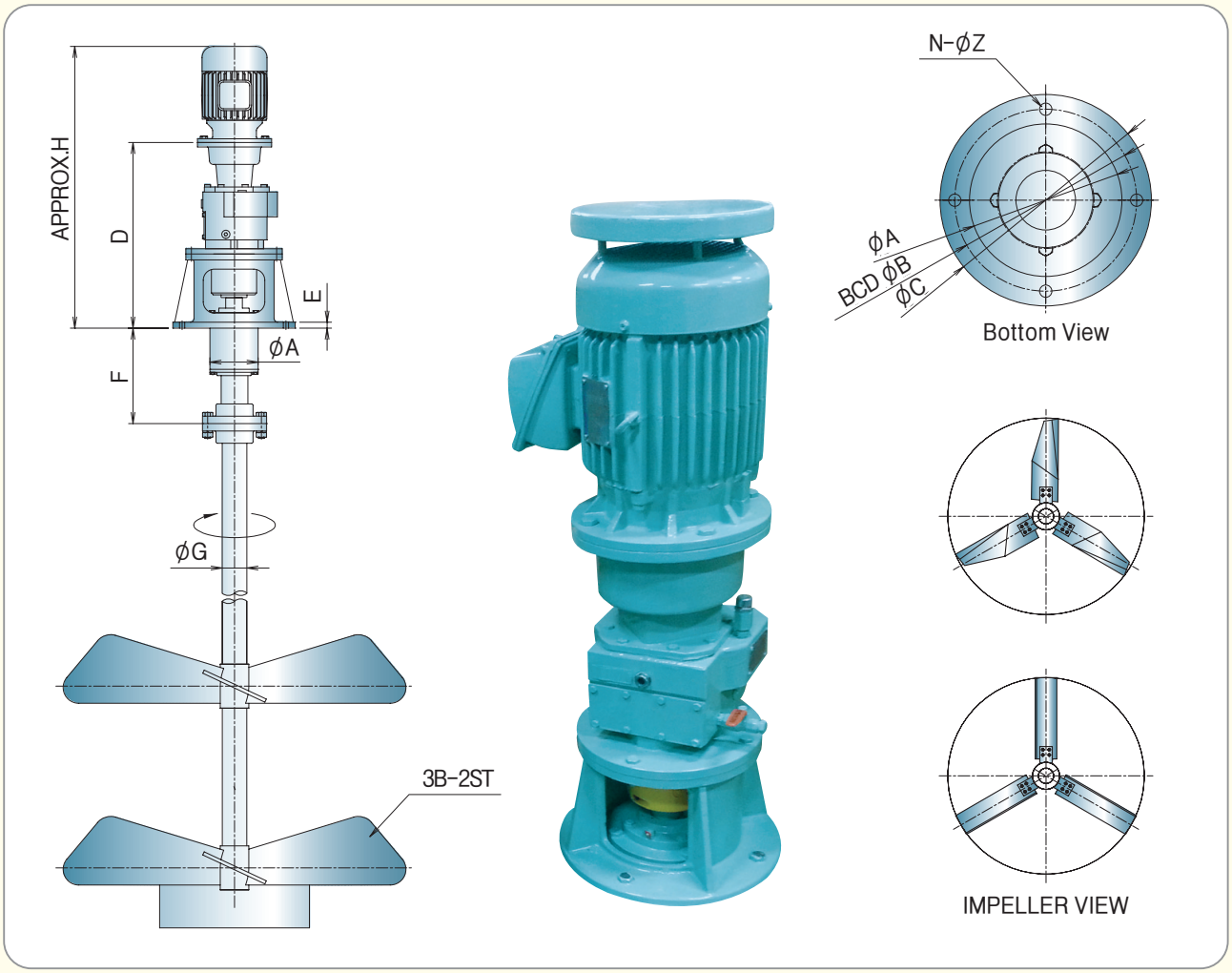
■ DIMENSION

(Unit : mm)

MODEL	A	B	C	D	E	F	G	H	I	J	K	L	M	N	W	N- ø Z
THFA-035	ø 140	ø 140	ø 200	311	14	10	3	570	132	170	130	ø 50	ø 30	33.3	8	4- ø 10
THFA-055	ø 180	ø 215	ø 250	349	24	15	3	664	159	200	155	ø 55	ø 35	38.3	10	4- ø 14
THFA-065	ø 230	ø 265	ø 300	424	37	16	3	770	174	215	165	ø 70	ø 40	43.3	12	4- ø 15
THFA-075	ø 230	ø 265	ø 300	460	37	16	3	839	211	250	195	ø 80	ø 50	53.8	14	4- ø 15
THFA-085	ø 250	ø 300	ø 350	519	32	18	4	993	273	300	245	ø 95	ø 60	64.4	18	4- ø 19
THFA-095	ø 350	ø 400	ø 450	582	43	22	4	1115	297	330	270	ø 110	ø 70	74.9	22	4- ø 19
THFA-105	ø 400	ø 450	ø 500	640	58	25	4	1173	328	370	305	ø 120	ø 80	85.4	22	4- ø 19
THFA-125	ø 500	ø 550	ø 600	688	51	28	5	1221	382	435	365	ø 150	ø 100	106.4	28	4- ø 23
THFA-155	ø 600	ø 650	ø 700	707	65	30	5	1240	401	470	390	ø 170	ø 110	116.4	28	4- ø 23

1) Motor 극수는 4P 기준임.(Motor : Stands for 4poles.)
2) Approx.D,H : 동력에 따라서 치수 변경.(Approx.D,H : Dimension depending on the power are change.)
3) 설계반영에 따라 사이즈 변경 및 제외가능.(Changes and excluding possible depending on the design.)

TWLA-S TYPE



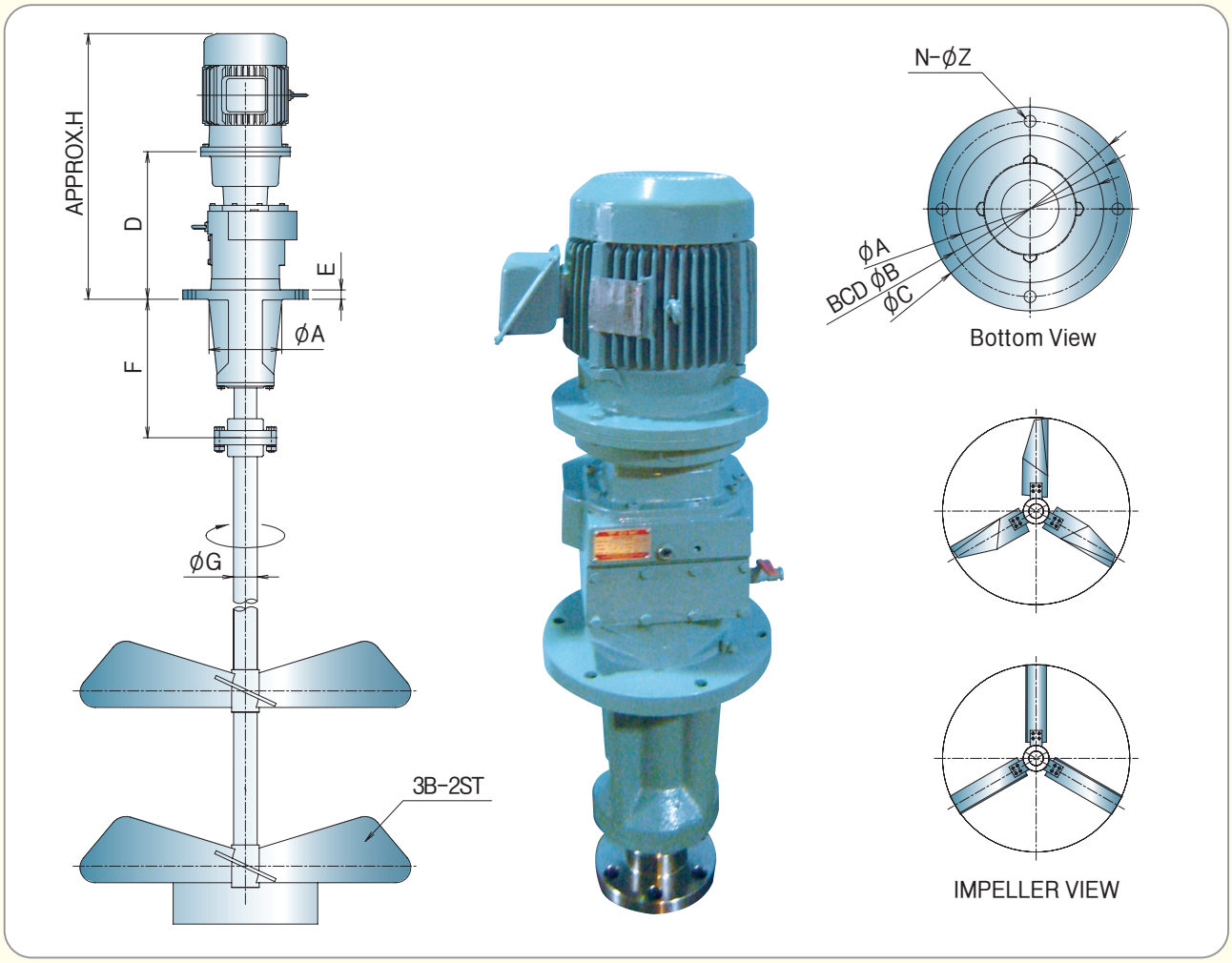
DIMENSION

(Unit : mm)

MODEL	A	B	C	D	E	F	G	H	N- ø Z
TWLA-S-03	ø 180	ø 240	ø 280	415	15	300	ø 30 - ø 35	630	4- ø 14
TWLA-S-05	ø 200	ø 280	ø 330	460	16	300	ø 40 - ø 45	780	4- ø 14
TWLA-S-10	ø 250	ø 350	ø 400	525	20	400	ø 50 - ø 65	870	4- ø 19
TWLA-S-15	ø 300	ø 400	ø 450	600	22	400	ø 70 - ø 75	1015	6- ø 19
TWLA-S-20	ø 320	ø 420	ø 470	700	30	500	ø 80 - ø 85	1360	8- ø 19
TWLA-S-30	ø 360	ø 500	ø 550	880	30	500	ø 90 - ø 100	1520	8- ø 23

1) Motor 극수는 4P 기준임.(Motor : Stands for 4poles.)
2) Approx.D,H : 동력에 따라서 치수 변경.(Approx.D,H : Dimension depending on the power are change.)
3) Mixing shaft&Impeller 조립볼트 체결시 Tarque값 참조.(P.12).
(Mixing shaft&Impeller assemble see the Standard torque table.) (P.12)
4) Mixing shaft&Impeller는 용도에 따라 변경될 수 있음.
(Mixing shaft&Impeller depending on the purpose of agitator are change.)
5) 설계반영에 따라 사이즈 변경 및 제외가능.(Changes and excluding possible depending on the design.)

● TWLA-M TYPE



■ DIMENSION

(Unit : mm)

MODEL	A	B	C	D	E	F	G	H	N- ø Z
TWLA-M-035	ø 180	ø 240	ø 280	280	20	300	ø 30 - ø 35	500	4- ø 14
TWLA-M-045	ø 200	ø 280	ø 330	305	23	300	ø 40 - ø 45	610	4- ø 14
TWLA-M-065	ø 250	ø 350	ø 400	335	26	400	ø 50 - ø 65	670	4- ø 19
TWLA-M-085	ø 300	ø 400	ø 450	390	29	400	ø 70 - ø 75	810	6- ø 19
TWLA-M-105	ø 320	ø 420	ø 470	460	32	500	ø 80 - ø 85	980	8- ø 19
TWLA-M-125	ø 360	ø 500	ø 550	510	35	500	ø 90 - ø 100	1070	8- ø 23

1) Motor 극수는 4P 기준임.(Motor : Stands for 4poles.)
2) Approx.D,H : 동력에 따라서 치수 변경.(Approx.D,H : Dimension depending on the power are change.)
3) Mixing shaft&Impeller 조립볼트 체결시 Tarque값 참조.(P.12).
(Mixing shaft&Impeller assemble see the Standard torque table.) (P.12)
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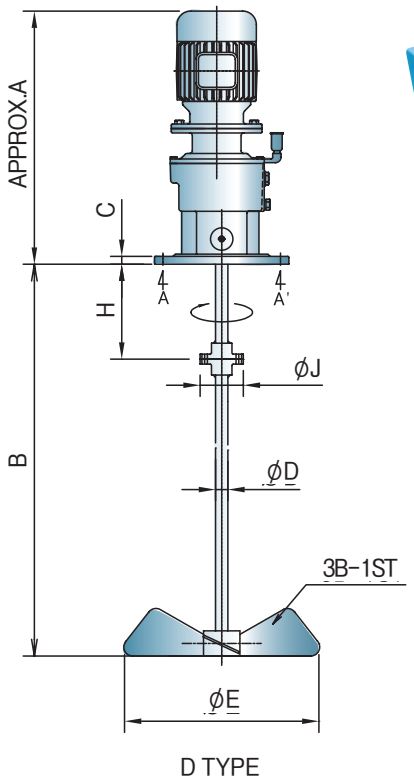
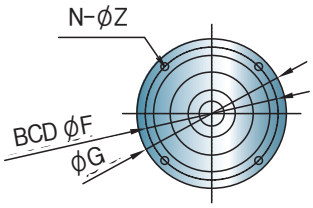
5) 설계반영에 따라 사이즈 변경 및 제외가능.(Changes and excluding possible depending on the design.)

TWAS / M / D /L TYPE



S TYPE

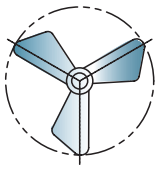
M TYPE



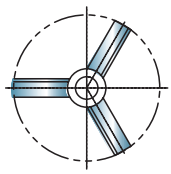
Bottom View

D TYPE

L TYPE



PROPELLER TYPE
120RPM 이하(Less than)



PADDLE TYPE
120RPM 이상(More than)

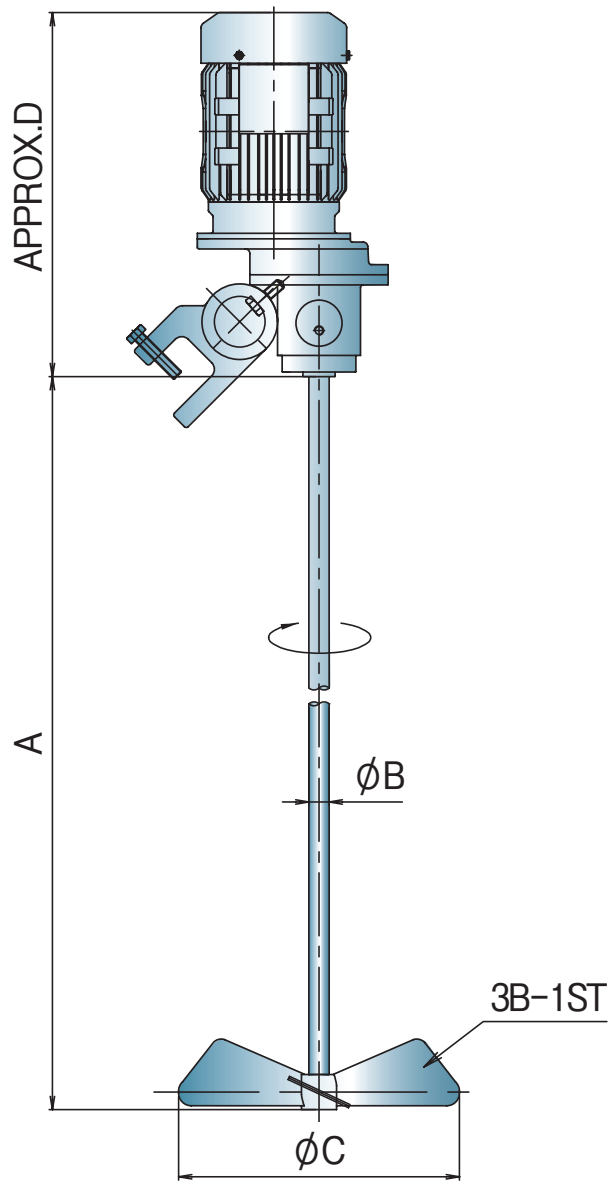
DIMENSION

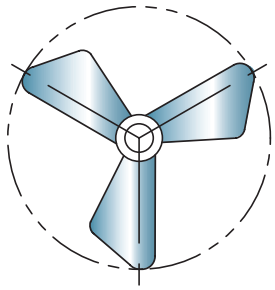
(Unit : mm)

MODEL	HP	RPM	A	B*	C	D*	E*	F*	G*	H*	J*	N-øZ
TWAS/M/D/L-005	1/2	60~360	380	1200	11	ø22	ø200	ø160	ø190	80	ø78	4-ø12
TWAS/M/D/L-01	1	60~360	470	1200	12	ø22	ø300	ø210	ø240	80	ø78	4-ø12
TWAS/M/D/L-02	2	60~360	590	1500	15	ø25	ø300	ø240	ø270	100	ø95	4-ø14
TWAS/M/D/L-03	3	60~360	680	2000	18	ø30	ø400	ø265	ø300	120	ø104	6-ø18
TWAS/M/D/L-05	5	60~360	670	2000	18	ø35	ø400	ø265	ø300	120	ø104	6-ø18

1) Motor 극수는 4P기준임.(Motor : Stands for 4poles.)
2) Approx.A : 동력에 따라서 치수 변경.(Approx.A : Dimension depending on the power are change.)
3) Mixing shaft&Impeller 조립볼트 체결시 Tarque값참조(P.12).
(Mixing shaft&Impeller assemble see the Standard torque table.) (P.12)
4) Mixing shaft&Impeller는 용도에 따라 변경될 수 있음.
(Mixing shaft&Impeller depending on the purpose of agitator are change.)
5) '*' 사이즈 변경 및 제외가능.(Changes and excluding possible depending on the design.)

● TWPA TYPE (PORTABLE)





PROPELLER TYPE

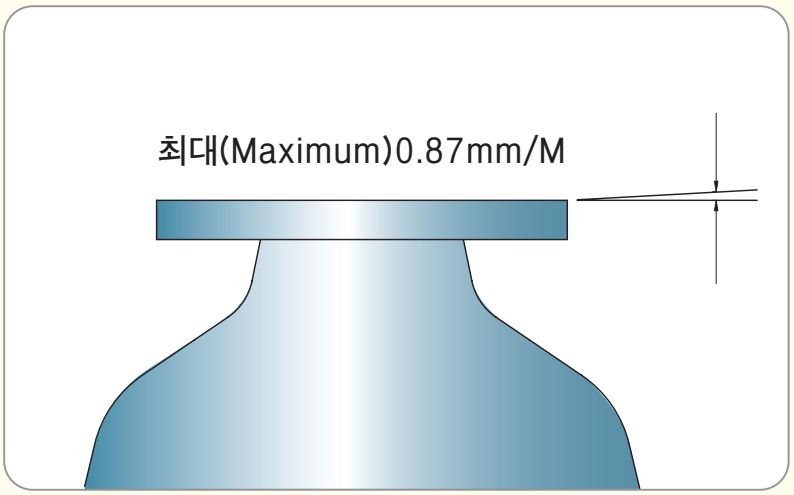
■ DIMENSION

(Unit : mm)

MODEL	HP	RPM	A	B	C	D
TWPA-005-7.5	1/2	240	1000	ø 22	ø 250	395
TWPA-005-5	1/2	360	1000	ø 22	ø 250	395
TWPA-01-7.5	1	240	1000	ø 22	ø 250	395
TWPA-01-5	1	360	1000	ø 22	ø 250	395

1) Motor 극수는 4P기준임.(Motor : Stands for 4poles.)
2) Approx.D : 동력에 따라서 치수 변경.(Approx.D : Dimension depending on the power are change.)
3) Mixing shaft&Impeller 조립볼트 체결시 Tarque값참조(P.12).
(Mixing shaft&Impeller assemble see the Standard torque table.) (P.12)
4) Mixing shaft&Impeller는 용도에 따라 변경될 수 있음.
(Mixing shaft&Impeller depending on the purpose of agitator are change.)
5) 설계반영에 따라 사이즈 변경 및 제외가능. (Changes and excluding possible depending on the design.)

● 준비작업 / 확인 (Preparatory Works / Checks)



BASE의 상부 수평 편차가 0.87mm/M 를 이내로 맞출 것. 수평이 맞지 않으면 감속기 기능과 설치 및 분해,조립이 안 될수도 있습니다.

(Checks that the vessel top's deviation from the level does not exceed 0.87mm/M)

하부 교반기 샤프트 삽입하기
(Insert the bottom Agitator shaft Section)

주 의 (CAUTION)	플랜지 표면이 손상되지 않도록 보호할 것. (Protect the flange surface from damage)

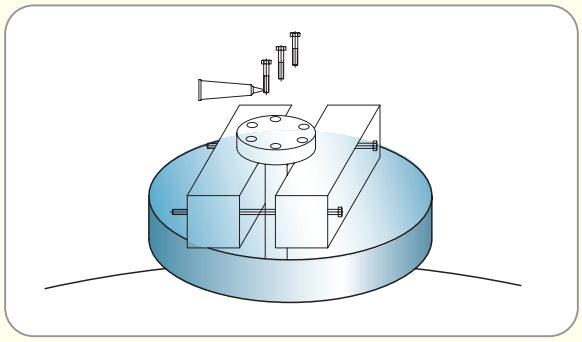
주 의 (CAUTION)	고무 코팅 손상 시 이를 설치 관리자에게 즉시 보고할 것 (Report damage of the rubber coating to the erection manager immediately)

교반기 샤프트를 잡고 이를 수직위치로 이동한다.

임펠러를 하부 교반기 SHAFT에 연결하기, 임펠러의 크기와 상부 용기 포트와 맨홀의 크기,
그리고 연결 방식을 결정하는 동안 임펠러를 용기의 외부에 설치하거나 또는 임펠러를 먼저 용기 내부로 맞추어 그곳에서 배열하거나 임펠러를 샤프트를 들인 후에 맨홀을 통해 용기 안으로 이동하는 것이 적절함.
이러한 결정은 현장에서 이루어져야 함.
“임펠러의 설치는 접합 교반기 샤프트 – 임펠러 허브” 항에서 기술하고 있음.

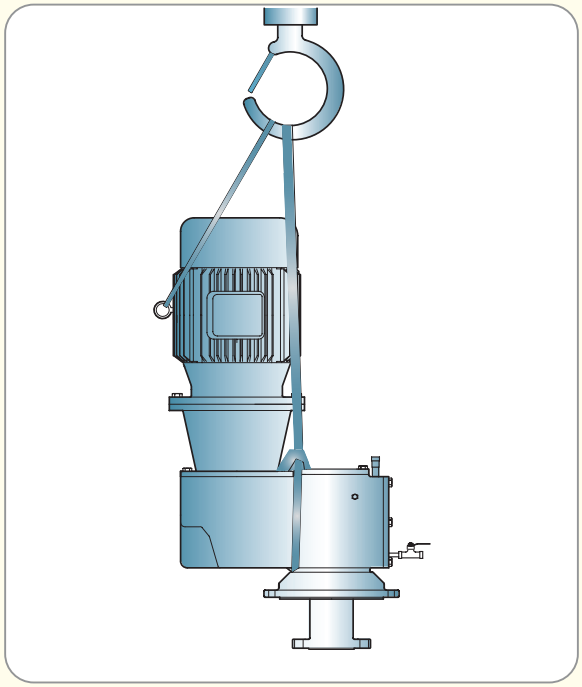
Connecting the impeller(s) to the bottom agitator shaft section Pending the size of the impeller, the size of the top vessel port and the manhole and pending the style of connetion it can be sensible either to mount the impeller outside the vessel or he impeller into the vessel beforehand and dispose it there or to bring the impeller into the vessel through the manhole after bringing in the shaft. This decision must be taken on site. The mounting of the impeller(s) is described in the section “junction agitator shaft–impeller hub”

● 교반기 샤프트 조립하기 (Assemble the Agitator Shaft)



● **하부 교반기 샤프트를 용기 안으로 내림**

(Lower the bottom agitator shaft section into the vessel)



WARNING

중심을 위로 잡은 후 작업 할 것
Make that the holding point is above the center of gravity–harzard of overturning

로프를 모터와 함께 묶는다.
With motors:
*Attach an additional rope to the motor

● **두개의 목재 빔을 샤프트의 양측 면에 위치하고 볼트를 삽입한 후 너트를 단단히 조여 샤프트와 빔사이에 약 1cm의 간극이 생기도록 함.**

(Position the two wooden beams on both sides of the shaft, insert the bolts and tighten the nuts so that there will begaps os appox. 1 cm between the shaft and the beams)

■ BOLT 조임 토르크(Kgf.cm) 조견표 (Final torque values) (Setting Bolt tightening Torque(Kgf.cm) Values)

호칭경 (Bolt Size)	최 소 (Minimum)	최 대 (Maximum)
M8	76	85
M10	152	169
M12	266	296
M14	422	469
M16	643	714
M18	872	969
M20	1,239	1,377

호칭경 (Bolt Size)	최 소 (Minimum)	최 대 (Maximum)
M22	1,679	1,866
M24	2,156	2,396
M27	3,194	3,549
M30	4,314	4,793
M33	5.919	6,577
M36	7,572	8,413
M39	9,866	10,962

교반기 샤프트 Run-Out 확인하기 (Checking the Agitator Shsaft Run-out)

- Motor fan cover를 제거하고 Fan을 돌려 수동으로 돌릴 수 있도록 함.

  교반기 샤프트의 말단에 눈금표시기를 적용함. 교반기 샤프트를 손으로 한바퀴 돌림.

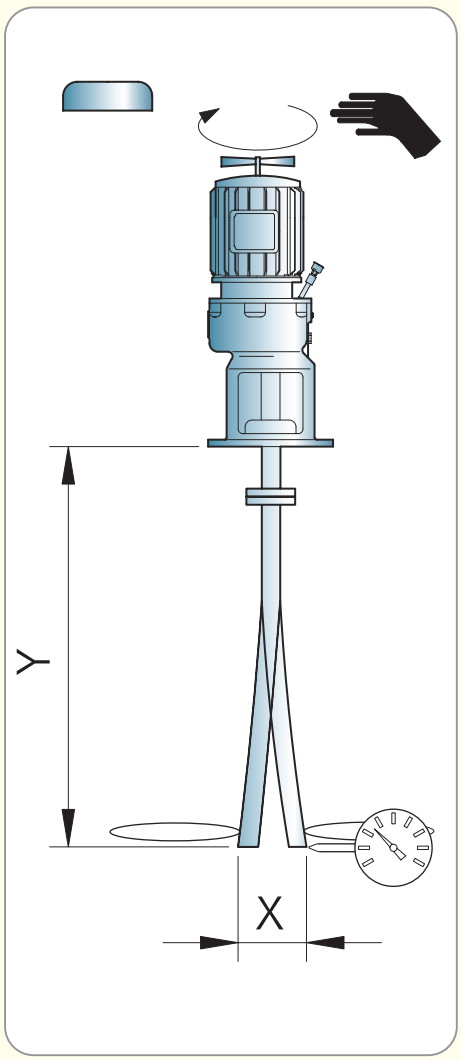
  표시된 Run-out 값(Y)을 계측하고 사양서에서 교반기 샤프트의 길이를 확인.

  표시된 총 Run-out 값 Xmax는 다음의 조건을 충족하도록 함.
  Xmax / Y <= 1/1000

  표시된 샤프트 미터 당 총 런아웃값은 1mm를 초과하지 않도록 함.
  다시 말해 샤프트의 가상의 중심선으로 부터의 편차는 샤프트 미터당 1mm를 초과하지 않도록 해야 함.

  예)샤프트 기장이 5m이면 총 런아웃 값은 5mm 를 초과하면 않됨.

- 고무계 라이닝 샤프트; 가능하면 돌려진 면을 측정하도록 함.(예, 캡 너트 상의 면, 고무계 접착 샤프트 면을 측정할 때 특히 이음매에서 고무계 라이닝의 고르지 못함을 보상하기 위해 Run-out 한계가 1.5mm 증가할 수 있음.)



- Provide access to the drive (e.g.coupling or fan wheel) sothat the the agitator can be rotated by hand

  Apply a dial-indicator to the end of the agitator shaft. Fully rotate the agitator shaft by hand(e.g.by turning thefan wheel)

  Measure the total indicated run-out X, read the length of the agitator shaft from the specification The total indicated Xmax run-out shall comply with the following condition :
  Xmax / Y <= 1/1000

  i.e. per meter shaft length the total indicated run-out shall not exceed 1mm in other words : the deviation from the imaginary center line of an absoluty true shaft shall not exceed 0.5mm per meter shaft length

- For rubberlined shafts : If possible, carry out the measurement on a turned surface, e.g. on the cap nut.
  When the measurement is being taken right on the rubberlined shaft the run-out limit may be increased by 1.5mm in order to compensate the uneveness of the rubberlining, particularly at the seam.

Run-out이 허용치를 초과하고 감속기 샤프트와 교반기 샤프트 사이의 플랜지 커플링이 있는 경우 : 커플링 플랜지의 두 부분 사이에 이물질 여부 확인 Run-out이 허용치를 초과하면 플랜지커플링사이에 shim plate를 끼어 넣어 Run-out을 맞추어야 하며 Run-out 조정이 불가할 경우 태우기계(주)에 연락을 취하기 바람.
(샤프트가 운송 중 휘어졌거나 플랜지가 손상 되었으면 이를 교정하여야함)

*주 의 : 작업 감독 없이 용기의 내부에서 작업하지 않도록함.

*Caution : Never work inside vessel without supervision

When the run-out exceeds the permissible value and there is a flanged coupling between the bearing shaft and the agitator shaft:Check that there are no foreign bodies between the coupling fiange halves If the T.I.R. stills exceeds the permitted value or the agitator comes without a flanged coupling but with a threaded coupling or integrated bearing agitator shaft instead:Contact the TAEWOO Service department (either the bearing shaft or the agitator shaft resp.the bearing agitator shaft suffered bending during transport or a fiange was damaged and must be trued)

운 전 / Operating

먼저 운전에 들어가기 전에 아래사항을 확인하여 주십시오.
Before operating, check the following:

1) • Motor Fan Cover를 열고 Fan을 손으로 돌려 회전하는 것을 확인합니다.
• Impeller가 경화 또는 고착된 Slurry에 묻혀 Motor Fan을 손으로 돌릴 수 없다면, Slurry를 Impeller 하단 밑으로 Drain 시킨 후 운전 하여야 하며,
• 정지 후 재가동 시 Slurry의 경화 또는 고착이 우려됨으로 반드시 Hand Turning 하여 Slurry의 경화 또는 고착 유무를 확인 후 운전하여 주십시오.

만약 경화 또는 고착된 Slurry에 묻혀 운전될 시 감속기 및 Shaft , Impeller에 심각한 파손이 우려됨으로 특별한 주의가 요구됩니다.

• Open Motor Fan Cover and use your hand to check that the fan is turning.
• If you cannot turn the motor fan because its Impeller is covered by hardened slurry buildup, drain slurry to the bottom of Impeller before operating.
• As slurry may harden and built up after stopping, always use the hand-turning technique to check that the fan is free of slurry and turning.

If you operate the machine with hardened slurry buildup, Reducer, Shaft, and/or Impeller may be seriously damaged.

2) 각 부의 Setting Bolts는 확실하게(Bolt 조임 토르크 조견표 참조) 조여 있는가?
Are the setting bolts of each part properly fastened (refer to Bolt Fastening Torque Chart)?

3) Tank의 고정 상태는 양호한가?
• Tank에 흔들림(진동)이 있으면 공진이 일어나 Shaft를 휘게 할 염려가 있습니다.
Is the Tank properly fixed?
• If tank is shaking (vibrating), the resonance might cause the shaft to bend.

4) Oil Level은 적절한가?
Is oil level appropriate?

5) 회전방향을 확인 하였는가?
• Impeller의 회전 방향은 화살표로 표시했습니다 (시계 방향) Motor상부에서 Impeller를 보고 우회전입니다.
Did you check the direction of turning?
• The Impeller's direction of turning is shown with an arrow (clockwise).
When you are facing Impeller from the top of Motor, it should turn clockwise.

• 만약 공회전하여 축이 휘었거나, Bearing 이 파손된 경우에 당사에서는 책임을 지지 않습니다.
Do not turn the tank while it is empty after connecting it to the Mixing Shaft.
The liquid should always fill over half of Impeller.
If you turn (operate) the tank while it is empty, the shaft may bend or the bearing, motor, and/or gear may be damaged.
• We are not responsible for it if the shaft is bent or the bearing is damaged by turning an empty tank.

6) 작동가능 상태가 확인되었을 경우 전원을 넣어 운전하십시오.
Plug the power and operate the machine when all of the above are checked and it is ready to operate.

운전 중의 주의사항 / Safety Suggestions

1) Switch 가까운 곳에 전류계를 설치하여 주십시오.
Install the Ammeter near the switch.

2) 운전 중 단시간이라도 정격전류를 넘는 경우는 자동적으로 운전이 정지되도록 대책을 세워 주십시오.
Establish plans so that the machine is automatically stopped whenever rated current is exceeded during operation.

3) 만일 이상 음이 발생하는 경우 운전을 정지하고 원인조사를 하여 주십시오.
If you hear an abnormal sound, stop the operation and check the machine.

보 수 / Repair

만일 어떤 원인으로 사고가 발생하여 간단히 처리할 수 없는 경우 당사 A/S로 연락하여 주십시오. 연락 시 아래 사항을 참고하십시오.
If there was an incident that requires professional service, please contact our A/S Center.
Please provide the following when you contact us.

1) 명판(Name Plate) 기재사항(형식, 번호, 제작 연월일. 제조번호)
Information on the Name Plate (Type, Number, Manufacture Date, Manufacture Number)

2) 구입경로 / Place of Purchase

3) 부분품 / Parts

4) Mixer 에 관한 참고사항 / Mixer Information

5) 주유 계획서(최근 주유 일시 등)
Lubricating Plan (last lubrication, etc)

* **주의 (Safety Suggestions)**
Mixing Shaft를 연결한 후 Tank 내에 액을 채우지 않고, 빈 Tank를 돌리지 마십시오.
Do not operating the empty tank after connecting mixing shaft Absolutely.

액은 최저수면을 Impeller 중간 이상 위치에 오도록 유지시켜 주십시오.
The lowest surface of liquid should be maintenance more than 1.5 times of impeller diameter above impeller.

빈 탱크인 상태에서 회전(작동)할 시 축이 휘거나 Bearing. Motor. Gear 파손의 원인이 됩니다.
If you operate the empty tank. the shaft may bend or the bearing, motor, and gear may be damaged.

Reducer's troubleshooting

Troubles	Cause	Measures
Heat generation	• overload operation • too little or too much of lubricating oil • bad or inappropriate lubricating oil • bad oil seal • obstructing motor ventilation • short circuit of stationary coil • Unparallel voltage • Shaft bended or tight tension of connecting part • bad bearing(worn out, rough) • forced assembly of bearing area, friction of parts	• Adjusting load or replacing with larger size • Check oil gauge • Change with new oil • Remove obstruction • Repair • Examine transformer • Check shaft, adjust tension • Replace • Examine after dismantling and adjust
Loud noise	• Regular noise–poor joining of gear teeth, broken bearing • High metal sound–lack of lubricating oil • Contact between stationary and rotary • Loosened stationary parts(shaft and gear, plunge joining part)	• Change gear, bearing, replenish lubricating oil • replenish lubricating oil • Remove obstruction(clean), change bearing • Repair • Examine after dismantling, remove obstruction, and replace
Heavy vibration	• Worn out gear teeth • Intrusion of obstruction • Worn down and broken bearing • Loosening of stocking bolt and stationary bolt • Loosening of assembly parts(shaft, gear) • Unparallel impeller(bad balance) • Broken case and joining parts	• Change gear • Remove obstruction and change lubricating oil • Change bearing • Examine after dismantling and reassemble • Examine the status of load and rejoin • Change
Leaking oil	• Broken oil seal • bad packing(joining part) • loosening of drain plug • broken and loosening of oil gauge • other welding parts leaking oil • worn out output shaft(oil seal part)	• replace oil seal • change packing and reseal • tighten plug(teflon tape) • Replace • Reweld or replace • Replace output shaft
Non-operation or trouble operation of motor	• Broken fuse • Shortage of starting torque • disconnection of coil • blackout or bad power supply • Overload • Jammed bearing and parts	• Examine capacity of fuse, replace • Replace starting method or enlarge capacity • Repair • Examine power supply • Measure current and examine load • Reassemble or replace

※When replacing gear, shaft or case, etc, please contact us and any temporary measures or incorrect part change may result in damaging the whole product so please take extra caution.

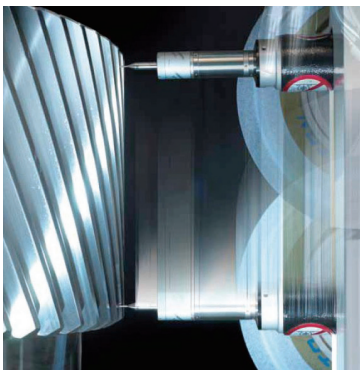
MAIN PRODUCT

◆ AGITATOR

- TWAS - TYPE
- TWAM - TYPE
- TWAD - TYPE
- TWAL - TYPE
- THFA - TYPE
- TWLA - TYPE

◆ GEARD REDUCER

- DRIVE UNIT & METAL BOX

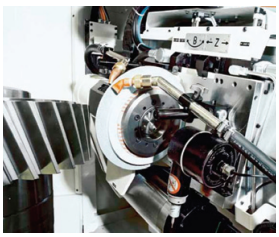


◆ CYCLO REDUCER

- DRIVE UNIT & METAL BOX

◆ TURN TABLE

◆ TAKE - UP DEVICE



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