

Installation, Operation and Maintenance Manual

Model 21 GTA, GTL, GTNT Agitators

Angle Mount Supplement

Equipment Reference:



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A. CHEMINEER ASSISTANCE

Chemineer maintains a fully staffed Parts and Field Service Department ready to help you with any service requirement. When in doubt contact your local Chemineer office, or Parts/Field Service department at the Chemineer Factory:

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For your convenience, Chemineer offers the following services:

- Installation and maintenance training seminars
- Installation and start-up supervision
- Preventative maintenance planning
- Parts order service

B. SAFETY



B.1 VESSELS

All types of vessels either open or closed pose special safety challenges. It is essential that Installers, Operators and Maintainers of the equipment understand these special hazards.

Particular safety hazards arise because the vessel is typically defined as a “Confined Space”. This creates a number of special hazards, including the risk of having oxygen shortages. Never enter a confined space unless you are fully trained on the procedures and have the correct safety equipment and procedures in place.

One must not enter a confined space unless fully assured that it is safe. Typically, before entering a vessel you should require proof of power and process fluid lock out. Always carry with you oxygen sensor (in order to verify a safe atmosphere), a suitable safety harnesses and lifting equipment. Typically, a shoulder lift harness and a man-lifting crane are required (a man on the end of a rope or a center back lift offers no safety protection). A suitable safety cover must be provided at all time.

In cases where a vessel has been in service, tests must be made to ensure that no hazardous products or product residues are present.

The work site is often within a designated hazardous area. Where potentially explosive conditions exist, all efforts must be made to make the area safe before proceeding with work. Where this is not possible, a detailed, individual hazard assessment is vital. Special working procedures and tooling are required.

B.2 FASTENERS

Important fasteners should not be re-used. When a fastener is disturbed, always replace it with a new one. Dispose used fasteners. Do not keep them for re-use.

B.3 SAFETY CHECKLIST

- ☑ This Installation, Operation and Maintenance Manual, assembly drawings, and any supplements must be reviewed and understood before commencing installation and operation.
- ☑ All site rules must be observed for the installation and operation of this mixer.
- ☑ Ensure all external connections are made in accordance with applicable codes of practice.
- ☑ The mixer must be earthed (connected to ground).
- ☑ Correct rotation must be checked prior to operation.
- ☑ **Do not** exceed the operating pressures, temperatures, and other conditions for which the machine has been designed.
- ☑ **Do not** operate the agitator unless all guards are securely fixed. Do not modify any guarding. Open tanks fitted with agitators must be provided with suitable guarding to prevent personnel contacting agitator-moving parts. The user is responsible for providing these guards.
- ☑ Ensure mechanical seal setting clips are disengaged before operation. These clips should be retained for future use.
- ☑ Ensure gas supply system, (if applicable) is correctly installed, pressurized and ready for operation.
- ☑ **Do not** touch rotating components.
- ☑ During servicing of the mixer, the motor must be isolated from the power supply and the supply locked out.
- ☑ **Do not** operate the mixer for applications other than for its intended use.
- ☑ **Do not** modify the mixer without reviewing the change with Chemineer. It is unsafe to use non-standard parts without Chemineer's approval. When in doubt, ask your local Chemineer office.

WHEN IN DOUBT, ASK!

C. OPTIONAL ANGLE MOUNTED DRIVE

Model 21 GT agitator drives are available with a 10° angle mounting option.

Angle mounting requires a specific mounting orientation and a special oil level. The angle of the GT gear drive **must** be oriented such that the motor end of the gear drive is low. See Figure 1 (page E-1) and Figure 2 (page E-2).

The *approximate* oil capacity for a 21GT gear drive mounted at 10° is 1.0 Gallon (3.8L). Always fill to the full mark on the dipstick, or use the oil drain hole on the front of the gearbox (Figure 1, page E-1). It is recommended to remove the drain hole plug [267] and fill the unit with oil slowly until oil comes out of the drain slot. Always check the oil level when the gearbox is not running, and in the angle-mounted position.

D. VESSEL MOUNTING

The Model 20 GT/HT A, L and NT agitators are designed to mount on an ANSI flange, nozzle or pad located on the vessel top head. See Figure 2 (page E-2) and Figure 3 (page E-3).

During normal operation of the agitator, the random fluid motion in the vessel will exert significant forces on the agitator shaft. Figure 2 (page E-2) shows these forces (flange mounted unit illustrated). The agitator has been designed to accommodate these forces, and as a result, the forces are transmitted directly to the mounting support. The mounting system must be rigid enough to support the agitator weight and the agitator reactions because of torque and bending moment. Further, it is not adequate to design the support system only for acceptable levels of stress in the support structure. The system must be rigid enough to prevent large deflections, which can result in agitator vibration.

The agitator assembly drawing includes the agitator weight, and the torque and bending moment values for which the support structure should be designed. In designing the structure to accommodate bending moment, the structure should be sufficiently rigid that the agitator extension shaft will not move more than 0.03 inch per foot (2.5 mm per meter) of length due to deflection of the structure. For high-speed units a greater level of stiffness should be achieved. An agitator mounted on a structure that is adequately rigid should typically have a vibration velocity of less than 9 mm / sec measured at the furthest end from the drive shaft.

The nozzle or pad and vessel top head must be rigid enough to support the agitator weight and limit the angular displacement of the agitator drive to 0.05 degrees as a result of the torque and bending moment. Refer to the agitator assembly drawing for the nozzle or pad design loads.

See Table 2, page E-4, and Table 3, page E-5, for the recommended vessel head thickness vs. vessel diameter, and mounting nozzle or pad size. These tables are to be used as a guide for determining when vessel head reinforcement is required.

The tables are based upon the use of the ASME flanged and dished heads, atmospheric design pressures and ChemScale® agitation levels of 6 to 7. Elliptical or hemispherical heads of the same diameter and thickness are more rigid than ASME flanged and dished heads. Design

pressures greater than atmospheric may require vessel head thickness greater than the table values. Very high ChemScale[®] agitation levels may require vessel head thickness greater than the table values. If the vessel head is not rigid enough, the head thickness can be increased or a reinforcement pad (Figure 3, page E-3) can be added.

This information is intended as a guide. However, it does not relieve the user of completely analyzing the entire mounting system.

E. ANGLE MOUNTED DRIVE, MODELS GTA, GTL & GTNT

Model 21 GTA, GTL and GTNT agitator drives furnished with the 10E angle mounting option may be angle mounted. Units furnished for horizontal mounting should not be angle mounted without consulting Chemineer Engineering first. See Figure 2, page E-2 for agitator nozzle location. See Table 1 (page E-4), Table 2 (page E-4), Table 3 (page E-5) and Table 4 (page E-5) for structural requirements.

NOTE: Angle mounted units must have the extension shaft assembled in a vertical position, prior to installation on the vessel. See the standard IOM manual for more information on the assembly and disassembly of your unit.

Install the assembled agitator drive onto the vessel nozzle using gasket and fastener set [1119] furnished by the customer (on stud mounted units, studs supplied). Torque bolts to the value shown in the standard IOM manual.

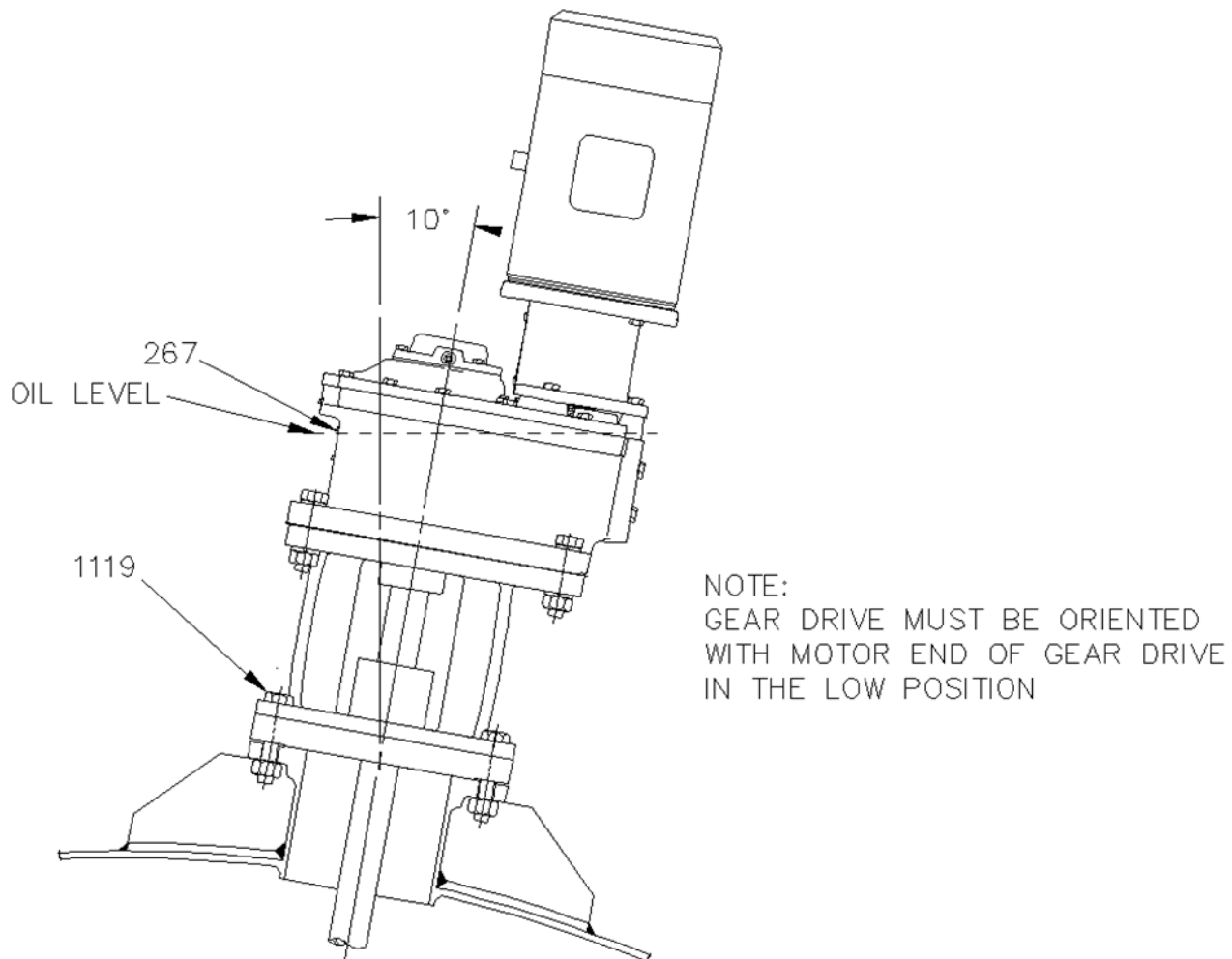


Figure 1. Angle Mounting

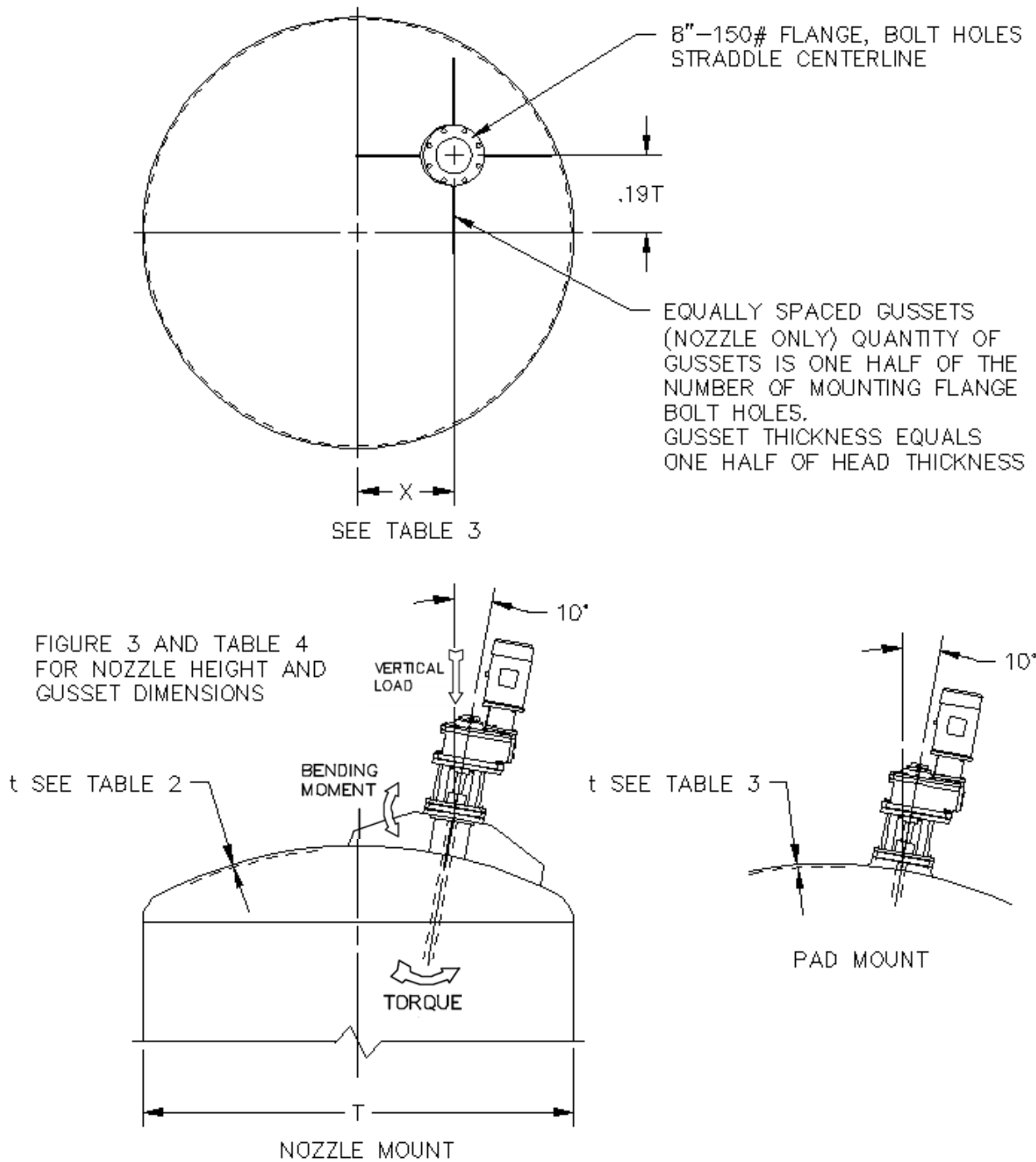


Figure 2. Angle Mounting

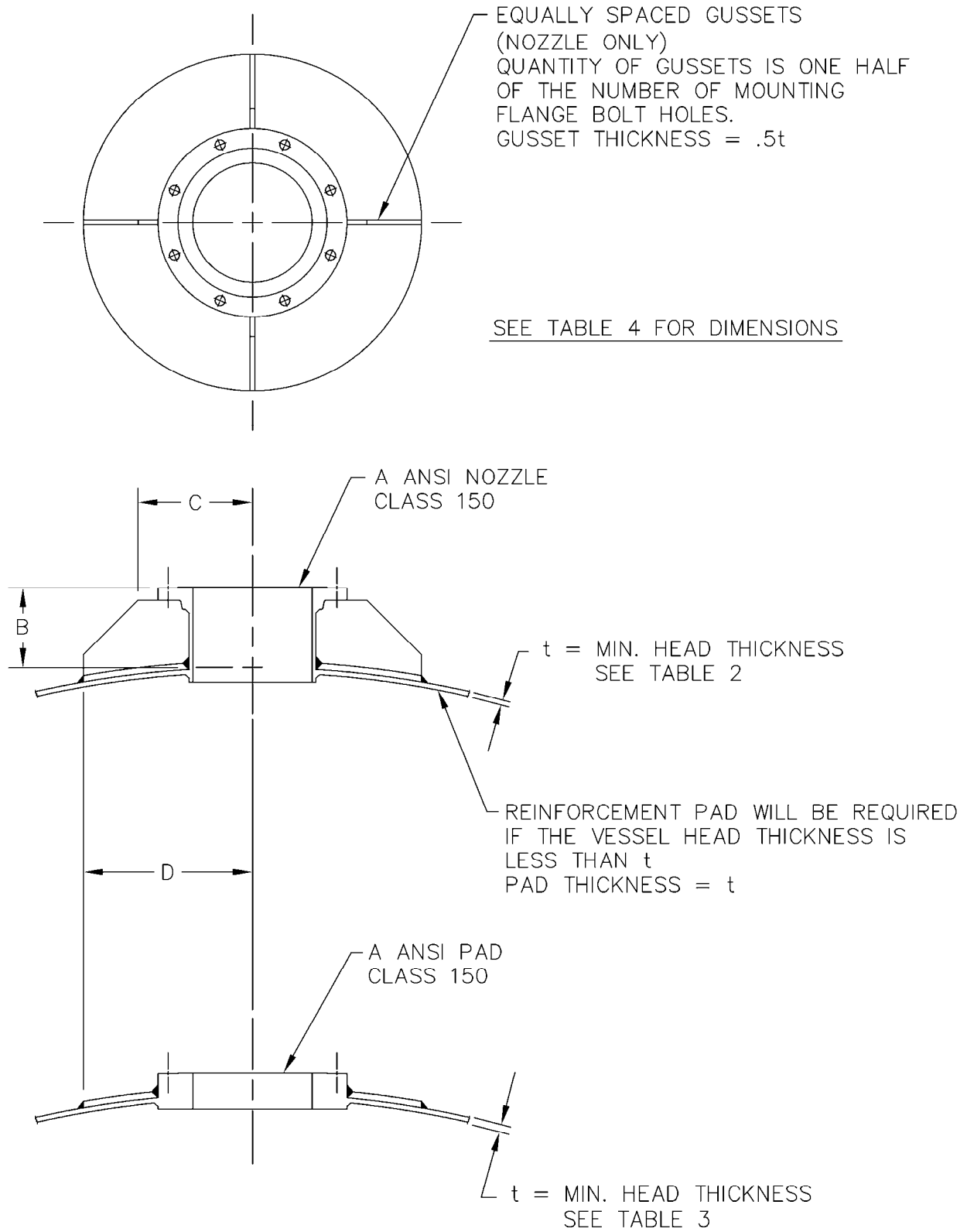


Figure 3. Vessel Mounting Nozzle/Pad

Table 1. OFF CENTER MOUNTING

Shaft Extension Range In. (mm)	“X” Dimension In. (mm)	Minimum Tank Diameter In. (mm)
38" - 53" (965-1346)	7.5" (191)	22" (559)
54" - 76" (1372-1930)	10.75" (273)	32" (813)
77" - 110 (1956-2794)	15.5" (394)	46" (1168)
111" - 158" (2819-4013)	22.5" (572)	66" (1676)
159" - 227" (4039 - 5766)	32" (813)	96" (2438)

Table 2. VESSEL HEAD THICKNESS (t), NOZZLE MOUNT

VESSEL DIAMETER Ft (m)	CASE SIZE (NOZZLE SIZE)
	21 GT (8")
4 (1.22)	.188" (5.0mm)
5 (1.52)	.188" (5.0mm)
6 (1.83)	.250" (6.0mm)
7 (2.13)	.313" (8.0mm)
8 (2.44)	.313" (8.0mm)
9 (2.74)	.375" (10.0mm)
10 (3.05)	.375" (10.0mm)
12 (3.66)	.438" (11.0mm)
15 (4.57)	.563" (14.0mm)
20 (6.10)	.688" (18.0mm)

Table 3. VESSEL HEAD THICKNESS (t), PAD MOUNT

VESSEL DIAMETER Ft (m)	CASE SIZE (NOZZLE SIZE)
	21 GT (8")
4 (1.22)	.125" (3.0mm)
5 (1.52)	.125" (3.0mm)
6 (1.83)	.125" (3.0mm)
7 (2.13)	.125" (3.0mm)
8 (2.44)	.188" (5.0mm)
9 (2.74)	.188" (5.0mm)
10 (3.05)	.188" (5.0mm)
12 (3.66)	.188" (5.0mm)
15 (4.57)	.250" (6.0mm)
20 (6.10)	.250" (6.0mm)

Table 4. AGITATOR MOUNTING NOZZLE/PAD REINFORCEMENT DIMS

CASE SIZE	A	B	C	D
21 GT	8"	6" (152mm)	8" (203mm)	12" (305mm)