

1 - FIELD OF USE

TITANOBEL offers an encartridged emulsion specially suited for blasting very hard rocks in quarries and in earthwork sites, even in presence of water. The products range varies from the classical version for ordinary works up the UG version, designed for high static or dynamic pressure conditions (underground blasting, decked charges in open pit blasting, trench blasting, blasting in cracked rocks or with water).

For each version, EMULSTAR is available in three different energy levels :

- EMULSTAR 3000, mainly used for column charge and for blasting soft rocks
- EMULSTAR 6000, for blasting hard rocks
- EMULSTAR 8000, for toe charge and for blasting very hard rocks. Because of its pyrotechnic characteristics, EMULSTAR 8000 is a very good substitute for dynamites.



2 - PRESENTATION AND PACKAGING

EMULSTAR is a grey colour paste like emulsion, encased in plastic tubing that is clipped at both ends and packed in 25 kg cardboard box.

Calibre (diameter in mm / weight in g)			
EMULSTAR 3000 AND 3000 UG	EMULSTAR 6000 AND 6000 UG	EMULSTAR 8000+	EMULSTAR 8000 UG
120/6000 - 24 kg	120/6000 - 24 kg	120/6000 - 24 kg	120/5000 - 25 kg
110/4800	110/4800* - 24 kg	110/4800* - 24 kg	110/4800* - 24 kg
100/4170*	100/4170*	-	-
90/3125	90/3125	90/3125	90/3125
80/2500	80/2500	80/2500	80/2500
70/2083	70/2083	70/2083	70/2083
60/1563	60/1563	60/1563	60/1563
50/1087	50/1087	-	50/1087
-	-	-	35/500*
-	-	-	30/400*
-	-	-	25/250*

* On firm order only

* EMULSTARS 3000 UG and 6000 UG are available upon special order.

3 - TECHNICAL CHARACTERISTICS

	3000	3000 UG	6000	6000 UG	8000 +	8000 UG
Measured characteristics						
Average density encartridged						
Ø > 40 mm	1,26	1,26	1,28	1,28	1,28	1,28
Ø ≤ 40 mm		1,22		1,25		1,25
Self excitation factor (cm)	4,5	4,5	3,5	3,5	10	10
Velocity of detonation (m/s)						
Ø 30 mm confined	5000	5200	5000	5200	5000	5300
Ø 80 mm confined	5500	5600	5500	5600	5600	5700
Average energy liberation (underwater test)						
Shock energy (Mj/kg)	1,75	1,75	1,98	1,98	2,26	2,42
Gas energy (Mj/kg)	1,88	1,75	2,09	1,98	2,67	2,38
Total energy (Mj/kg)	3,63	3,50	4,07	3,96	4,93	4,81
Calculated characteristics						
Oxygen balance (g/100g)	-0,3	-0,3	-1,3	-1,3	-3,4	-3,4
Gas volume (l/kg)	902	869	820	785	732	710
Energy(cal/g) - (kJ/g)	3,79	3,65	4,77	4,56	5,79	5,61
Strength (Mj/kg)	0,83	0,80	0,98	0,94	1,14	1,10
Detonation pressure (calculated assuming measured detonation velocities)						
Ø 30 mm confined (GPa)	7,6	8,2	8,1	8,1	8,1	8,8
Ø 80 mm confined (Gpa)	9,5	9,9	9,7	9,7	10,3	10,4
Resistance to compression (bar)						
Resistance to static pressure Ø ≤ 40 mm / Ø > 40 mm	3	60/380	3	60/380	3	60/380
Resistance to dynamic pressure Ø ≤ 40 mm / Ø > 40 mm	(*)	200/420	(*)	200/420	(*)	200/420

(*) depends on blasting delay

4 - OPERATING CONDITIONS

Recommended shelf life for EMULSTAR is one year after the date of manufacture. Priming must be done with 0.6 g PETN detonator or with 20 g/m detonating cord.

EMULSTAR UG must be used when the blasting pattern or the rock characteristics may provoke important interactions between explosive charges (static or dynamic compressions).

Maximum temperature for use : + 70°C

Maximum storage temperature : + 50°C

In low temperature conditions (< - 10 °C), EMULSTAR UG should preferably be used.

5 - ADMINISTRATIVE DESIGNATIONS

Type E mining explosive	3000 and 3000 UG	6000 and 6000 UG	8000+ and 8000 UG
Storage classification	1.1.D	1.1.D	1.1.D
Shipping classification	1.1.D – UN 0241	1.1.D – UN 0241	1.1.D – UN 0241
Certified for charging in vertical blast holes and underground work (without risk of methane or flammable dust)	0080.EXP.04.0007	0080.EXP.07.0064	0080.EXP.01.0037
	0080.EXP.04.0008	0080.EXP.07.0065	0080.EXP.01.0038

6 - RESPONSIBILITIES

The information and recommendations contained in this document are based on manufacturer's and distributor's research and tests on this date. The manufacturer and distributor cannot anticipate all the possible applications of its products described in this document and sold under the only warranty to be in conformity with the CE mark examination certificate and to be in compliance with the certifications granted by the competent French ministries.